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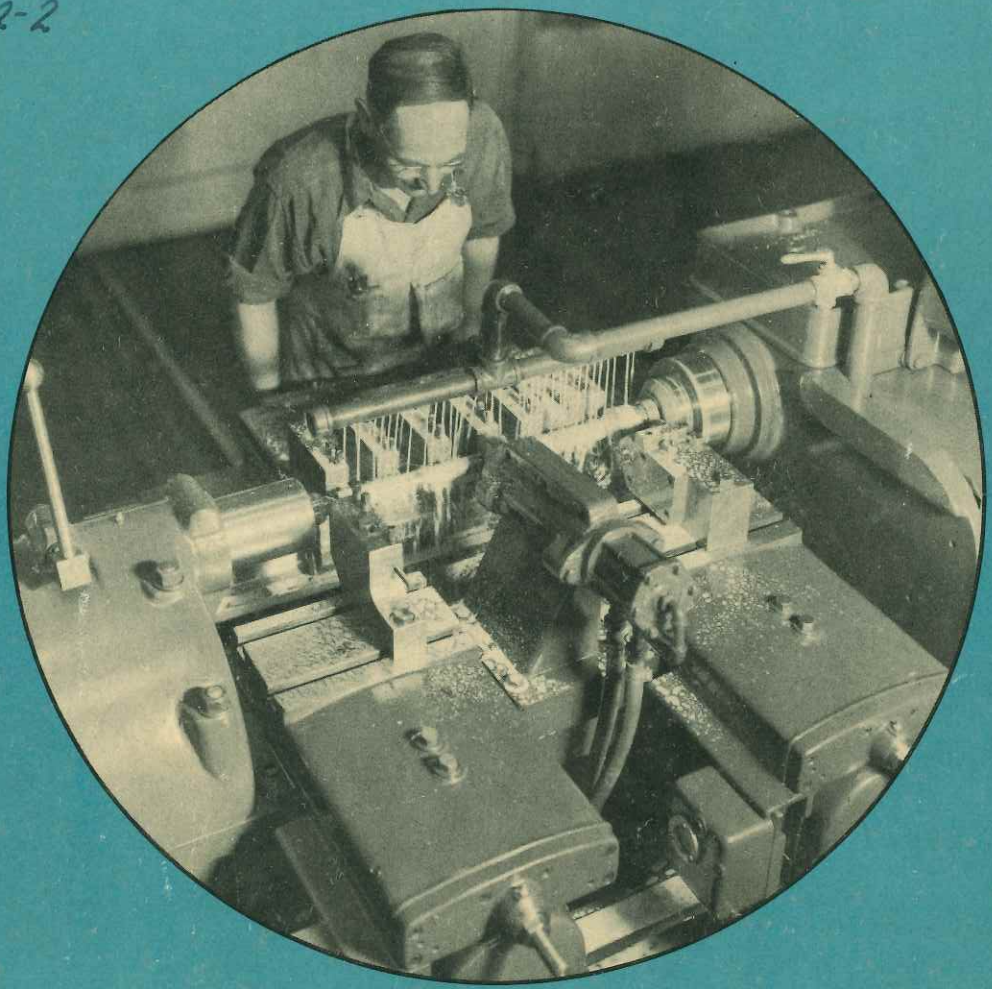
INSTRUCTIONS FOR

INSTALLATION OPERATION MAINTENANCE

OF YOUR *Model 10*

Automatic Lathe

Patent Nos.
2145255 - 82-21
2206886 - 82-21
2144735 - 82-2



Div. 13
TJ
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SUNDSTRAND MACHINE TOOL CO.

ROCKFORD, ILLINOIS • U.S.A.

82/117

DIV. 13

TJ
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THE length of time a machine operates at maximum efficiency depends to a great extent upon the care given it by the operator.

In order that you may receive the maximum benefit from your Automatic Lathe, we have prepared this booklet which contains instructions for setting up, care, and operation of your machine. This machine being of unit construction can best be described and illustrated in accordance with the various units. Unit assembly drawings and instructions pertaining to the various units which make up the machine are shown on pages 13 through 30. The actual location of these units in relation to the machine is shown on page 3.

If this booklet is read carefully before any attempt is made to set up or run this Automatic Lathe, the care and handling of the machine will be greatly simplified, its lifetime increased, and the operator can take full advantage of its time saving features.

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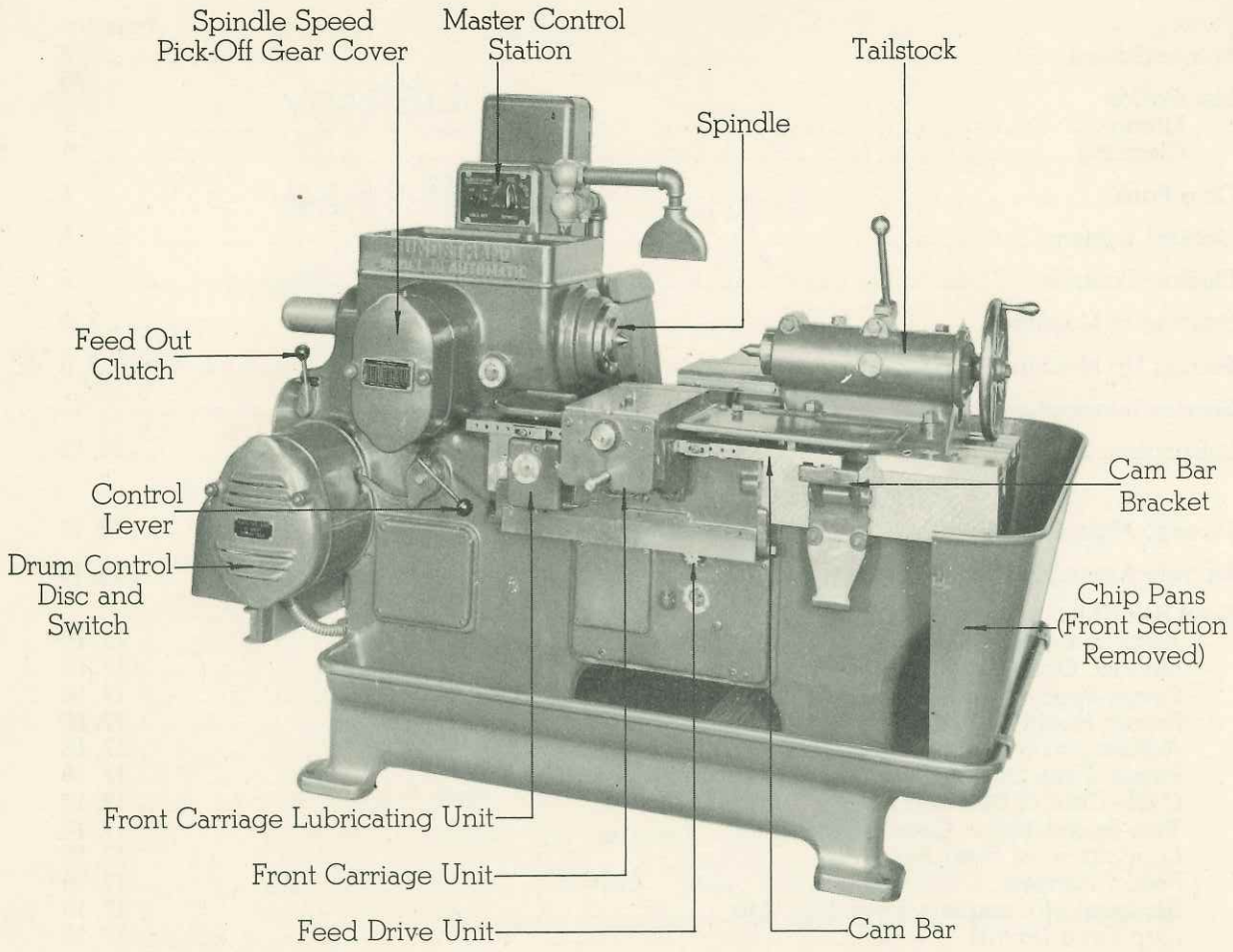
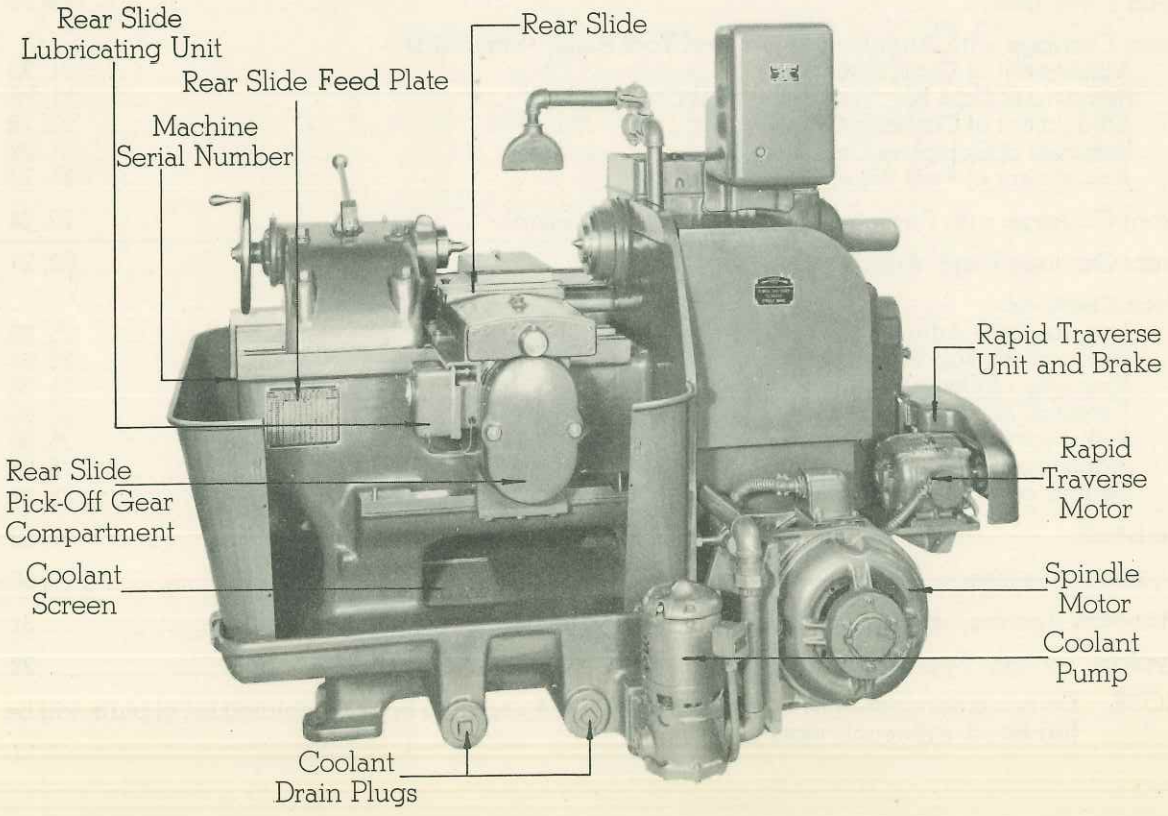
NOTE: Do not order spare parts from this booklet. A separate book containing list of parts will be furnished with each machine.

NOMENCLATURE

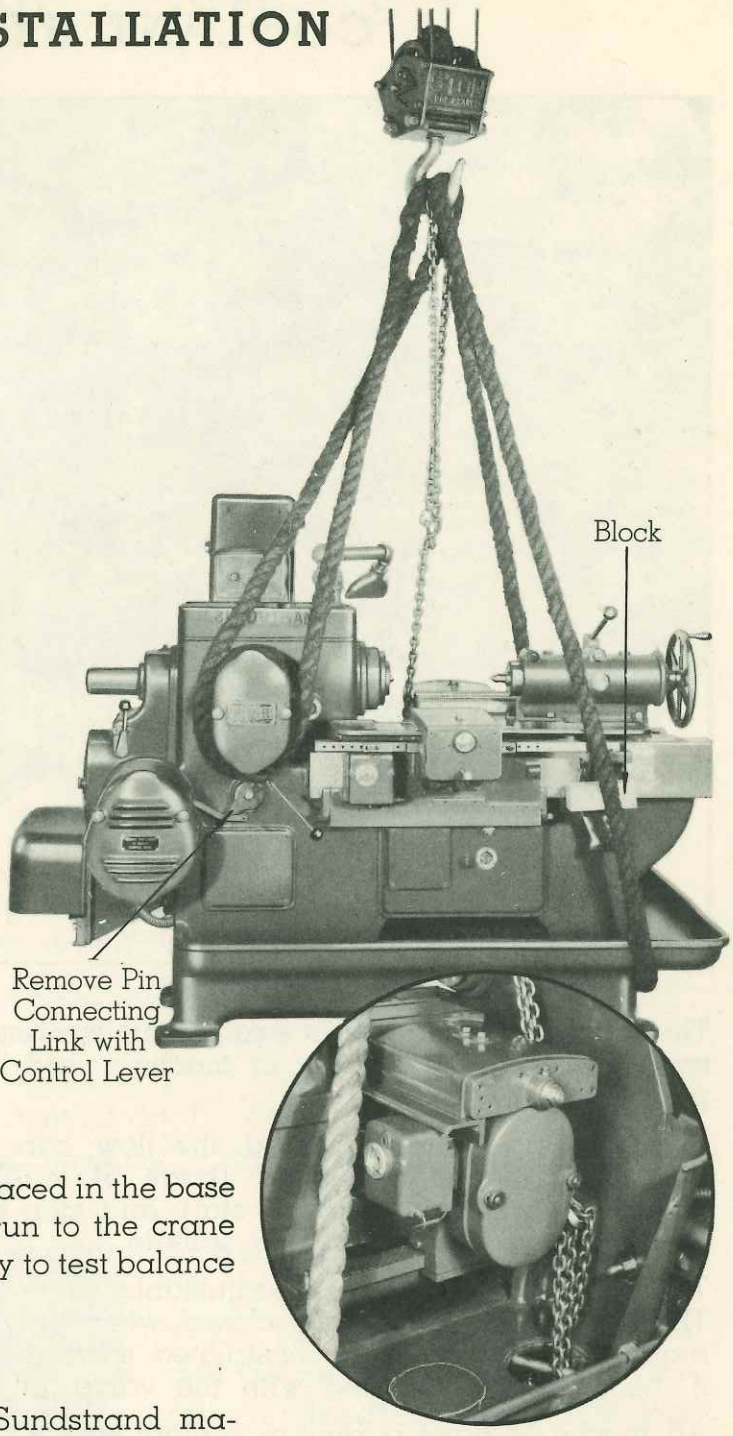




INSTALLATION

Lifting

Illustrations at right show proper method of lifting an Automatic Lathe. Before lifting, all splash guards must first be removed. Loop a rope sling over the crane hook with one end around the spindle pick-off gear compartment and the other end down around the pan on the base of the machine. NOTE: Remove pin connecting control lever with link from drum switch so that rope sling will clear control lever arm. Place a block between the sling and the cam bar bracket or carriage so as to keep the pressure of the rope from the tray and the cam bar (see photo at right). The rope sling supports the front, but because of the spindle motor, the machine is heavier in the rear. To compensate for the unbalanced condition, a chain is used to carry the weight in the rear. By removing the clean out cover, an iron bar can be placed in the base from which the chain can be run to the crane hook. Raise the machine slightly to test balance of sling before lifting.



Cleaning

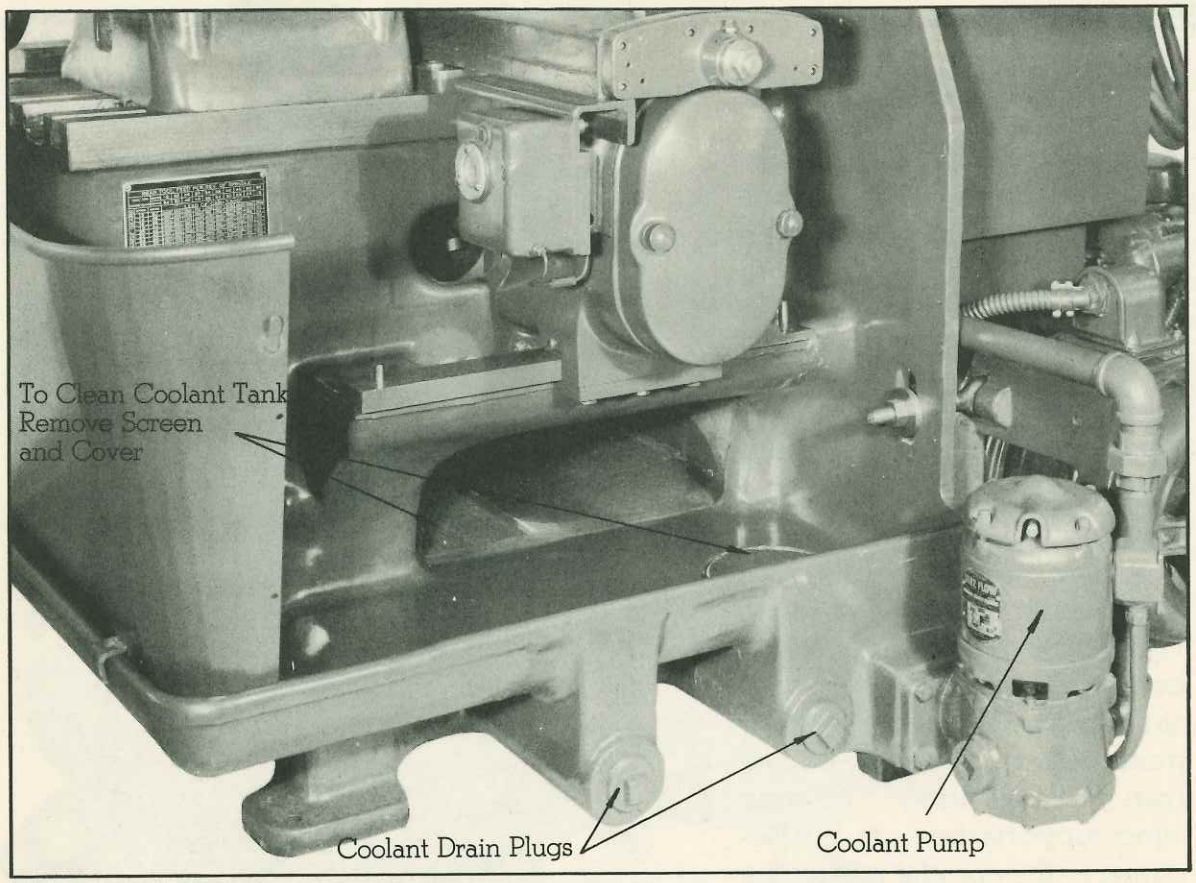
The finished surfaces on all Sundstrand machines are sprayed with a protective coating of anti-rust solution. Before setting up or operating the machine, this anti-rust solution should be removed with rags and either kerosene or gasoline. These surfaces should be very carefully cleaned, making certain that all grit and foreign material which might be injurious is removed.

After cleaning, cover all surfaces with a thin film of good grade machine oil and follow the regular lubrication procedure given on pages 11 and 12.

Chip Pans

The chip pans run practically all the way around the machine and a section may be taken out in the rear which makes it very easy to scoop out and remove the chips.

COOLANT SYSTEM



The Coolant Pump (extra equipment) is of individual motor driven impeller type. It is located in rear of machine and has a capacity of ten gallons per minute.

When coolant is not required, the flow can be stopped by switching the button on the control panel (page 6) to Coolant "Off". With button at Coolant "On" the flow will start and stop automatically with the starting and stopping of the machine spindle.

The coolant nozzle has an adjustable valve for regulating the coolant flow. The valve can be partially closed when only a small amount of coolant is required. The pump is constructed so that no damage will be done even if the pump is operated with the valve fully closed.

All machines have a built-in coolant reservoir (capacity—15 gals., Model 8, 20 gals. Model 10 and 12) in the base. To fill the reservoir, pour the coolant into the chip pan and it will then drain through the strainer down into the reservoir. The intake to the coolant pump is directly thru a cored channel in the base and the only piping necessary is from the pump to the coolant nozzle.

To drain the tank most of the coolant can be pumped out of the reservoir thru the coolant nozzle. The remainder can be drained into a shallow container thru the Coolant Drain Plug shown in picture above. The Model 8 Lathe has one drain plug and the Models 10 and 12 (as shown above) have two drain plugs.

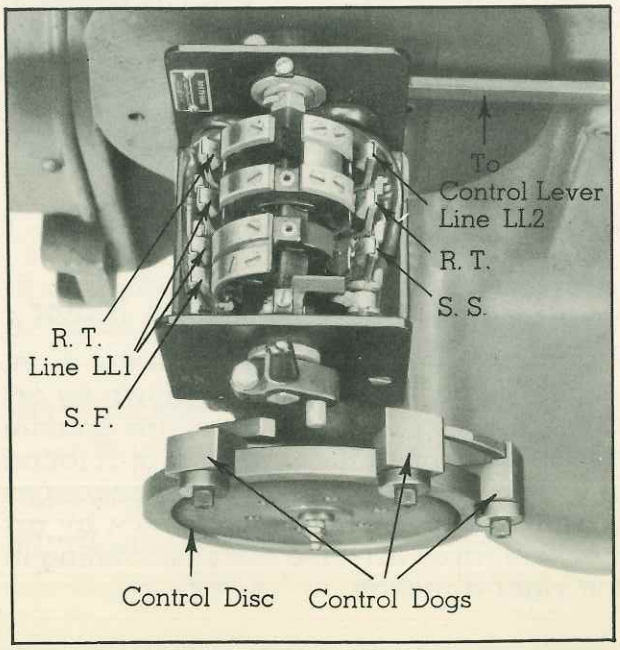
Coolant reservoir can be cleaned by removing the screen and clean-out cover shown in above photo.

ELECTRIC CONTROLS

The machine is controlled from a master control station located on top of machine and also from a drum switch located on front of the feed box. The master control station consists of a drum switch and an "off" and "on" selector switch. The drum switch has three positions "auto", "safe stop", "cont." When drum switch is in "safe stop" position, the whole machine is inoperative. For continuous spindle, turn handle to "cont." position and for automatic spindle, turn handle to "auto." The spindle may be jogged by turning handle from "cont." to "safe stop" and the rapid may be jogged from "safe stop" to "auto." **Note.** When jogging rapid the drum switch in front of the feed box must be either in rapid approach or rapid return position. The selector switch on the master control station is an "off and on" switch for the coolant pump.

The drum switch located on front of the feed box directly operates the rapid motor and controls the automatic starting and stopping of the spindle motor. When this switch is in the rapid approach position, the rapid motor is operated by contact "R. T." and the spindle is started by contact "S. S."

In the feed position the rapid contact "R. T." and the spindle start contact "S. S." are broken. The spindle, however, continues to run, making its holding circuit through contact "S. F."

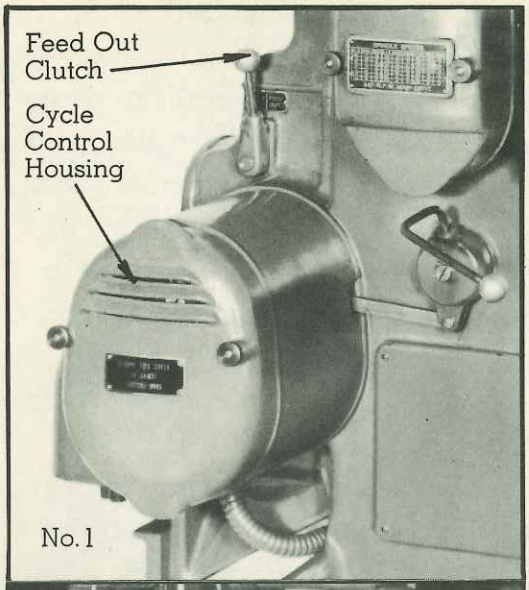


In the rapid return position contact "S. F." is broken and the spindle stops. The "R. T." contact is made and the rapid motor running in the reverse direction returns the tool slides to the starting position.

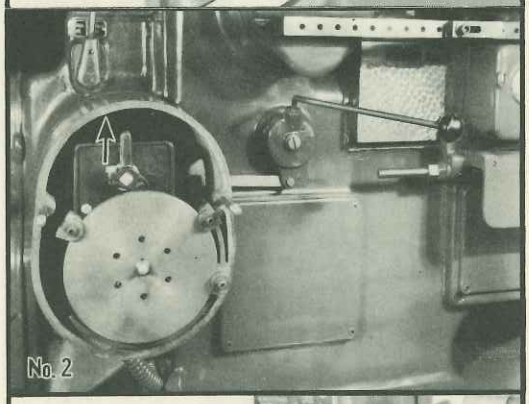
In operation the drum switch is actuated either by the control lever or by dogs clamped to the cycle control disc (page 6 or page 17—view 2-2).

NOTE: For complete wiring information see wiring diagram furnished with machine.

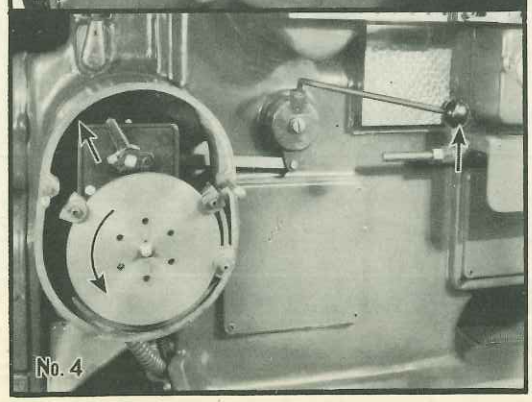
STARTING OF MACHINE



No. 1


No. 2

No. 3


No. 4

Caution:

The following should be checked very carefully before starting the machine under power in order to avoid possible damage:

1.—Check lubrication in accordance with Lubrication Chart (pages 11 & 12) to make certain that all units are lubricated properly as the machine is drained before shipment.

2.—Move feed out clutch lever to Feed Out position and remove cover from Cycle Control housing. After cranking the machine by hand thru a complete cycle to make sure there is no outside interference with the slides move feed shift lever back to feed in position.

3.—Spindle and rapid traverse motors should be checked in following manner:

Cycle control housing cover (see fig. No. 1) should be removed to expose cycle control disc and drum switch "latch" as shown in fig. No. 2.

Rotation of Spindle Motor

With drum switch "latch" in vertical position, (see arrow fig. No. 2) which is the neutral or feed position, "inch" the spindle (move the selector switch shown in Fig. No. 3 from "Safe-Stop" to "Cont." and back to "Safe-Stop" very rapidly so that spindle rotates only approximately one inch at a time) and make sure the spindle rotates counterclockwise which is the direction shown by the arrow in fig No. 3. Do not leave the selector switch on "Cont." but return to "Safe-Stop."

Rotation of Rapid Traverse Motor

Pull the control lever up so that the drum switch "latch" is in direction shown by arrow in fig. No. 4. Then "inch" the spindle again and check the direction of rotation of the drum control disc. If the disc rotates counterclockwise (direction shown by arrow) the rapid traverse motor is rotating in the right direction.

STARTING OF MACHINE (Cont'd)

To start machine, turn switch on master control station from "safe stop" position to "automatic" position. Move control lever up (see fig. No. 4) to "rapid approach" position. This starts main spindle, rapid motor and, if coolant is used, the coolant motor. The tool slides are now in fast motion approaching the work.

The control disc (see fig. No. 4) is now in motion and dog marked "rapid approach to feed" engages control crank and moves same from "rapid approach to feed" or central position. This stops rapid approach and the feed begins.

At the end of the feed stroke, dog marked "feed to rapid return" engages control crank and moves same from "feed to rapid return" position. This stops spindle and coolant motors and starts rapid motor in reverse direction. Tool slides are now in fast motion away from the work.

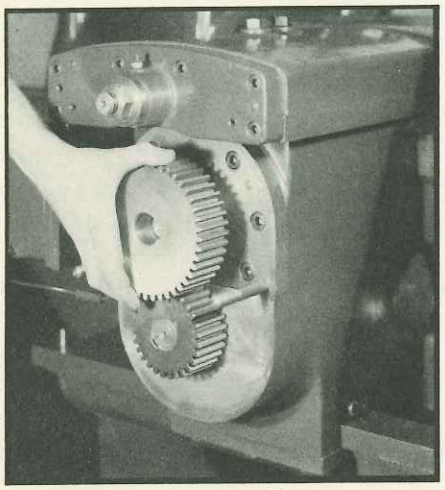


Fig. No. 5

Control disc is now rotating in reverse direction and when dog marked "rapid return to neutral" engages contol crank and moves same from "rapid return to neutral", or center position, machine stops. Machine has now completed its cycle and by again moving control lever as described above the cycle will be repeated.

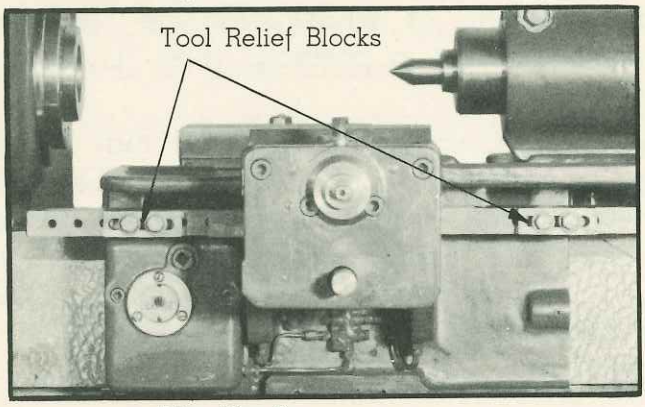


Fig. No. 6

Automatic cycle can be obtained by substituting dog marked "rapid return to rapid approach" for dog marked "rapid return to neutral." With this dog the machine will, after once started, automatically repeat its cycle and keep on running until handle on master control station is positioned on "safe stop".

SETTING UP MACHINE

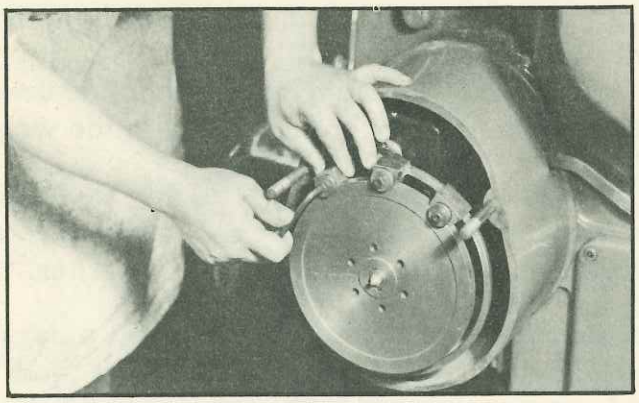
If a finished turned work piece is available, considerable time can be saved in setting up a Sundstrand Automatic Lathe for a multiple tool job. To set up the machine proceed as follows:

(1) Disconnect the rear tool slide by removing pick-off gear (Fig. No. 5) under rear slide. Also remove tool relief blocks (See Fig. No. 6) on front cam bar.

(2) Put finished turned work piece in the machine.

(3) Start machine and when front carriage gets into suitable position in relation to the work piece, stop machine by turning switch to "safe stop" position.

SETTING UP MACHINE (Cont'd)



(4) Adjust control dog marked "feed to rapid return" ready to trip control into rapid return.

(5) Release feed clutch (See fig. No. 1 page 7) and, by hand, crank front carriage until "feed to rapid return" dog (on control disc) trips control into rapid return. Then roughly position tools around work piece, allowing some clearance.

(6) By hand, crank front carriage back to a position allowing for clearance to load and unload the work. The carriage may also be run back under power by "jog rapid" on control, in this way "inching" carriage back. Great care should be taken that tools or cross slides do not run into tailstock or some other interference on the back stroke.

(7) With front carriage in back position, adjust control dog marked "rapid return to neutral" so control crank is in neutral or center position.

(8) By hand, crank tools up to a point where feed should begin, allowing approximately ⅛" clearance, and adjust dog marked "rapid approach to feed". NOTE:—Tool slide has micrometer adjustment for various diameters of work. (See page 21).

(9) If feed-in attachment is used, determine at what point the "feed-in" should begin, then clamp cam bar bracket in position. (See "LL" page 21 or "H" page 23).

(10) If automatic tool relief is used, this should be so adjusted that before carriage returns, block clamped to cam bar should move tool relief cam over permitting cross slide to withdraw; and before carriage stops on the return stroke the opposite block, also clamped to cam bar, should be adjusted to move tool relief cam pushing tools in "forward" ready for the next cut. (See Fig. No. 6 page 8 and BB & CC page 21.)

(11) Front carriage should be at end of feed stroke in position for rapid return before following setting of rear slide.

(12) Move rear tool slide in "forward" position and make sure cam roller is in dwell. A special wrench to fit the end of the cam shaft is supplied with the machine and should be used for this work. Connect rear tool slide by replacing pick-off gear.

(13) Now the machine has been set in proper relation to work piece and final adjustment of tools may be made.

(14) Proper gears for front and rear tool feeds may be had by consulting feed charts. For proper spindle speeds consult speed plate located on front of speed pick-off gear cover.

(15) **Caution:** For long feed stroke on front slide be sure to select proper feed gear for rear slide to prevent running into solid end of cam track.

SERVICE INFORMATION

Before leaving our plant all machines are tested very thoroughly but in transit and in service there is always a possibility of something getting out of adjustment. The following are a few minor troubles which may arise and procedure for correcting them.

If feed stops under heavy cut or does not start at all:

(1) A rattling noise can be heard indicating that the Safety Clutch is not adjusted properly. To adjust see page 17 and 18.

(2) The feed lock may not be working properly. To adjust see page 17 and 18, views 3, 4, and 5 and description.

(3) Check feed out clutch (see page 7 or 17) to make certain that it is properly engaged.

CAUTION: Any of the following troubles require the services of the plant electrician and he should make certain that the power is cut off from machine before making any corrections.

If the spindle does not start:

(1) The overload relay may have kicked out and should be reset.

(2) Contact at spindle start contact "S.S" may be broken. (See page 6). Check with a feeler gauge or piece of paper to make certain that the finger is actually contacting the segment.

(3) Check for loose connections in wiring.

(4) Speed pick-off gear may be missing.

If spindle stops before rapid return engages:

(1) Contact "S.F." (See page 6) is broken before snap action brings switch over and the machine stops. To correct bend finger over to maintain contact until snap action takes place.

(2) Check for loose connections in the wiring.

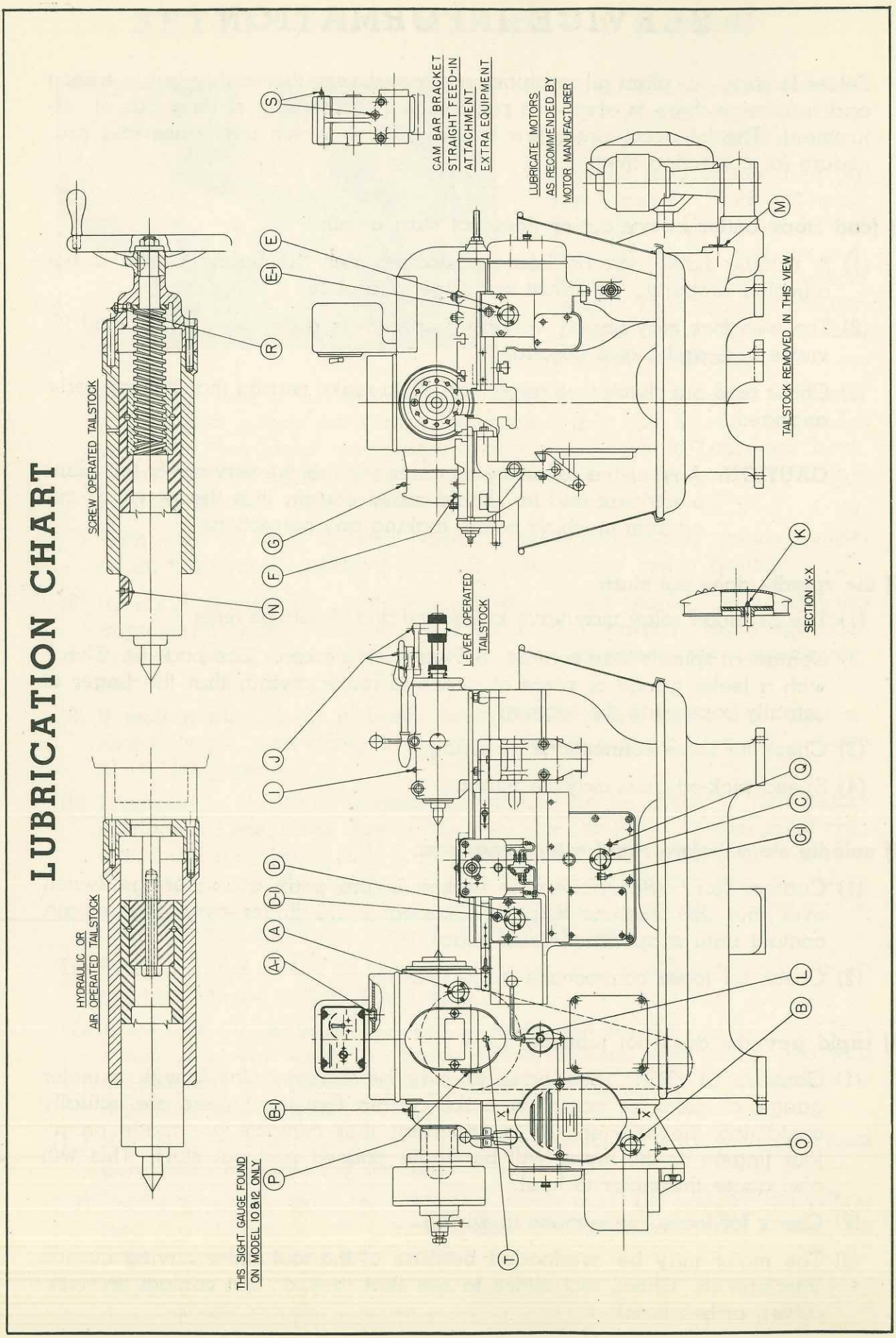
If rapid traverse does not function:

(1) Contacts at "R.T." (See page 6) may be broken. Check with a feeler gauge or piece of paper to make certain that the fingers are actually contacting the segment. It is important that contacts are made on all four fingers or the motor will be single phased and not start. This will also cause the motor to heat.

(2) Check for loose connections in wiring.

(3) The motor may be overloaded because of the tool slides having outside interference. Check tool slides to see that they do not contact tailstock, driver, or headstock.

LUBRICATION CHART



LUBRICATION CHART

(INSTRUCTIONS)

FOR ALL LUBRICATION USE "GARGOYLE ETNA OIL HEAVY MEDIUM, OR EQUAL".

AUTOMATIC LUBRICATION. Keep oil to center of sight gauge for best results. See below.

A —Sight Gauge
A-1—Filler Plug
B —Sight Gauge
B-1—Filler Plug
C —Sight Gauge
C-1—Filler Plug
D —Sight Gauge
D-1—Filler Plug
E —Sight Gauge
E-1—Filler Plug

SPECIAL NOTICE: Found on Models 10 & 12 only

P —Sight Gauge

MANUAL LUBRICATION ONCE A MONTH

F—Lubricate once a month
L—Lubricate once a month
N—Lubricate once a month

MANUAL LUBRICATION ONCE A WEEK

I—Lubricate once a week
J—Lubricate once a week
K—Lubricate once a week
R—Lubricate once a week
S—Lubricate once a week

MANUAL LUBRICATION ONCE A DAY

G—Lubricate once a day

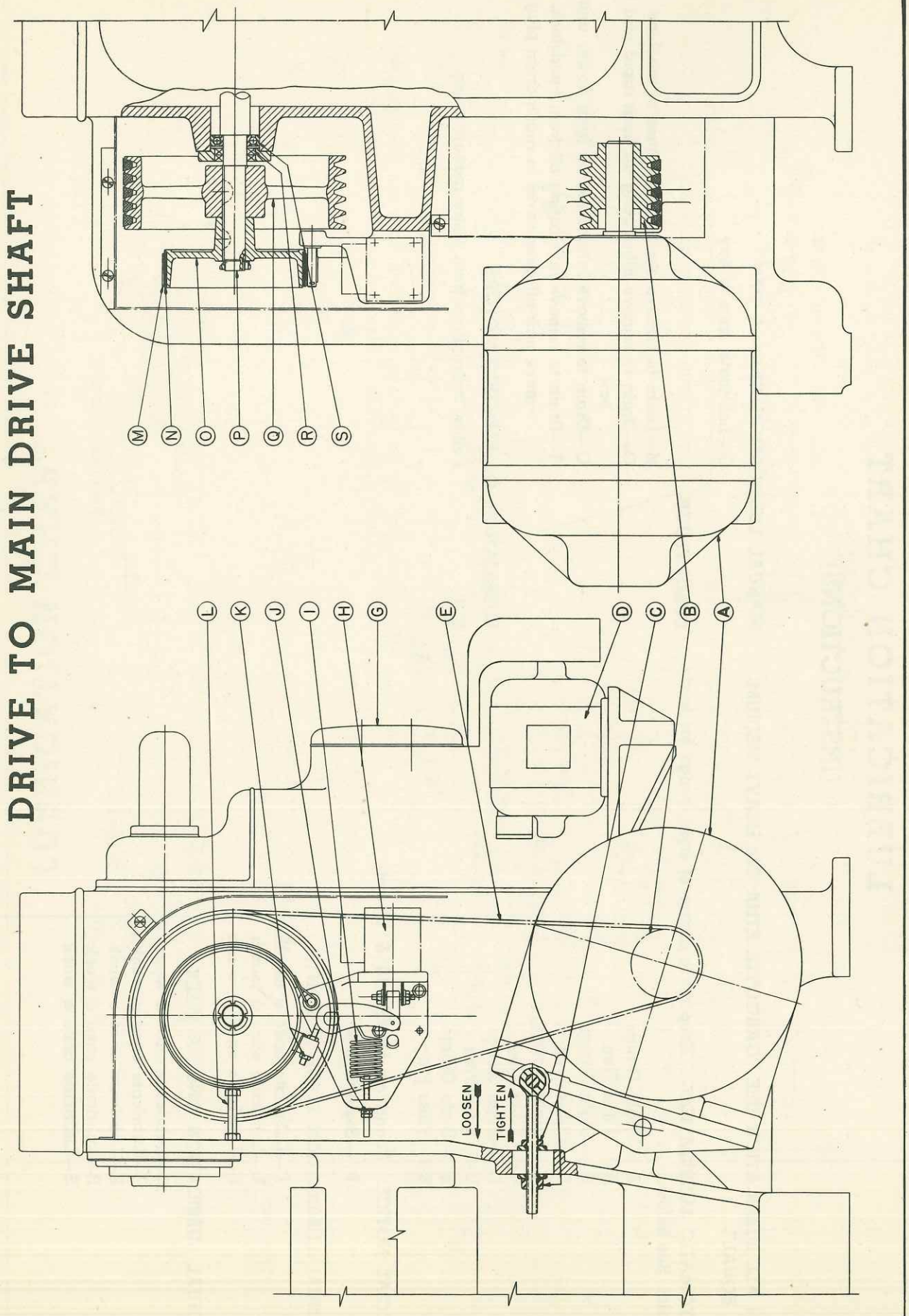
DRAIN PLUGS

M—Drain to remove coolant from base of machine
O—Drain to remove lubricating oil from rapid and feed box
Q—Drain to remove lubricating oil from power unit
T—Drain to remove lubricating oil from headstock. (Remove pick-off gear cover to reach drain plug.)

LUBRICATION OF ELECTRIC MOTORS

Follow instructions from motor manufacturer.

DRIVE TO MAIN DRIVE SHAFT



DRIVE TO MAIN DRIVE SHAFT

(INSTRUCTIONS)

A—Shows position of spindle drive motor.

B—Shows location of drive motor pulley.

C—Shows construction of adjustment to "V" belt that drives main drive shaft from spindle motor: Drop motor to tighten: Raise motor to loosen "V" belts.

D—The purpose of this motor is to drive the rapid traverse, motor runs in one direction to rapid approach and in the opposite direction to rapid return the carriages.

E—Five "V" belts are used to drive the Model 8 Lathe. Seven "V" belts are used to drive the Models 10 and 12 Lathes. The belts must be matched as to length to give satisfactory results.

G—Under this cover is located the change gears for changing the feed to the front slide.

H—Location of solenoid to release spindle brake and is operated by energizing solenoid.

I—This spring applies spindle brake and is put into action upon releasing current in solenoid.

J—These lock nuts are used to adjust spring tension. By tightening nuts more tension is applied to spring, therefore, a quicker spindle stop. By loosening nuts less tension is secured and slower spindle stop is obtained. Proper adjustment should be made to correspond with the length of cut being taken. Spindle must be stopped when carriage returns to starting position.

K—This adjustment is to maintain the gap between the brake lining and brake drum. This gap should be about 1/32" to 1/16" when brake is released.

L—The purpose of this stud is to hold the brake band in a central position with the brake drum. This prevents brake lining from dragging on brake drum when brake is released.

M—Steel brake band.

N—Brake lining riveted to brake band.

O—Brake drum.

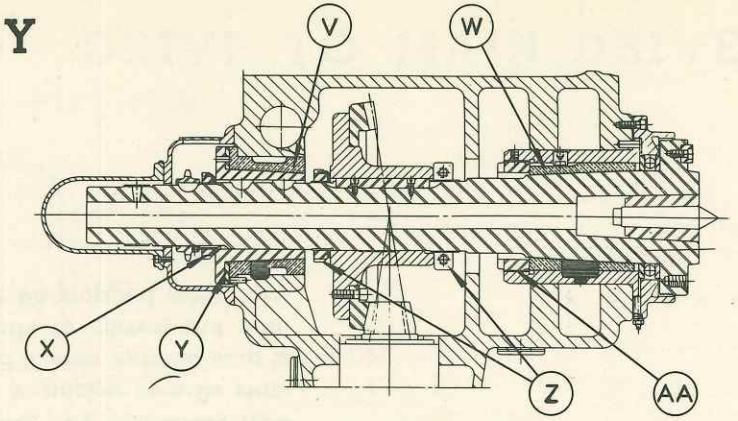
P—Main drive shaft.

Q—Main drive pulley.

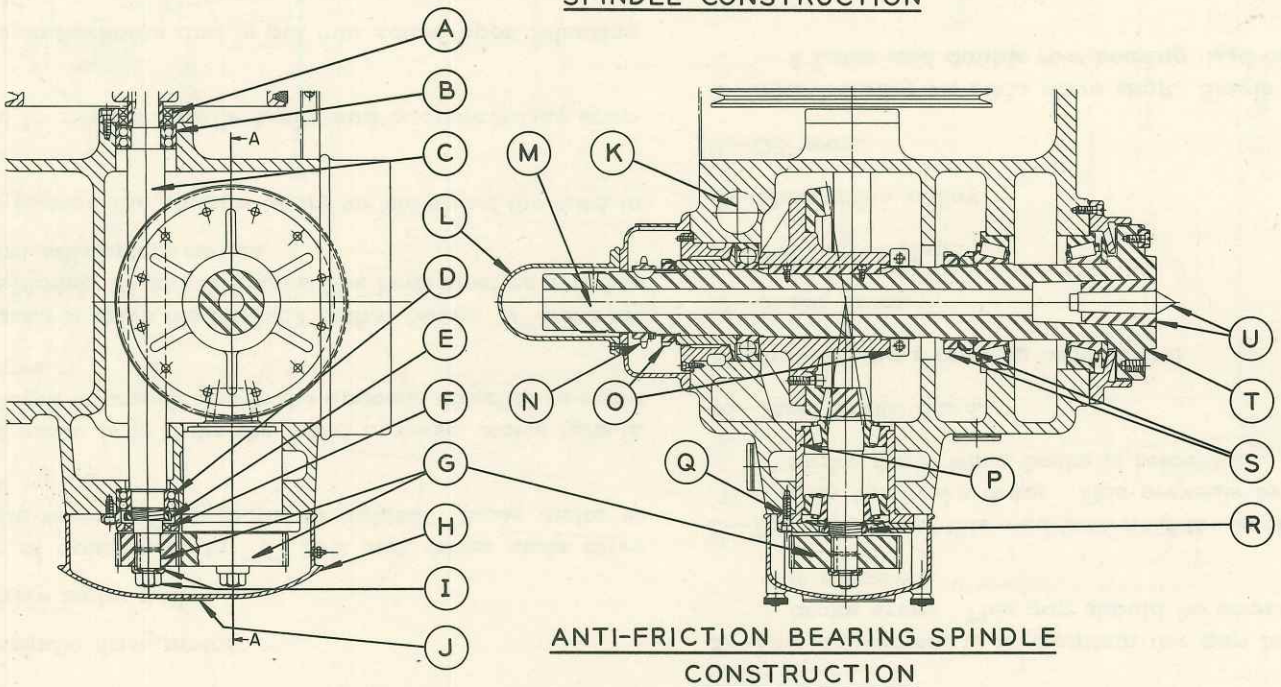
R—Oil seals.

S—Rear bearing on main drive shaft. Single row bearing used on Model 8 Lathe and double row bearing used on Model 10 & 12 Lathes.

SPINDLE ASSEMBLY



PLAIN BEARING
SPINDLE CONSTRUCTION



ANTI-FRICTION BEARING SPINDLE
CONSTRUCTION

SPINDLE ASSEMBLY

(INSTRUCTIONS)

A—Oil seals. Rear end of main drive shaft.

B—Double row ball bearing mounting for rear end of main drive shaft. This bearing floats in housing because thrust is taken on front bearing. This bearing takes radial loads only.

C—Main drive shaft.

D—Double roll ball bearing which takes thrust and radial load on the front end of the main drive shaft.

E—Lock nut for holding front bearing in place on shaft.

F—Housing for holding front bearing in place. Assembled with oil seal.

G—Pick-off gears for changing spindle speeds.

H—Removable cover to enclose speed pick-off gears.

I—Nut and washer for holding pick-off gear securely to main drive shaft. Drive to the pick-off gears is taken by means of a hardened key which is riveted securely to the main drive shaft.

J—Speed plate conveniently located on the front of the pick-off gear cover.

K—The main drive shaft for feeding the overhead slide passes through this cored hole when third slide is attached to the machine.

L—Housing or cover to encase end of spindle and drawrod. The purpose of this is to protect the operator from getting caught in a revolving part of the machine. This housing is not used when air cylinder equipment is attached to the machine.

M—Hole in spindle for drawrod for holding special chucks and fixtures that are attached to the spindle nose of the machine.

N—Chain sprocket which drives the feed box located on the end of the machine.

O—If it becomes necessary to adjust the ring gear back lash with the drive pinion this can be done by adjusting the two lock nuts shown at this position.

P—This housing contains the assembly of bearings, retainer, and drive pinion that meshes with ring gear mounted to the machine spindle.

Q—If adjustment is necessary to get proper gear contact this can be accomplished by adding or removing shims at this position.

R—On the Model 12 Lathe adjustment of the roller type pinion bearings can be made by loosening or tightening lock nut at this position. On the Model 10 Lathe which has ball bearings lock nut "R" only holds the bearings in place.

S—If the front spindle bearings become loose they can be adjusted by adjusting the two lock nuts at this position.

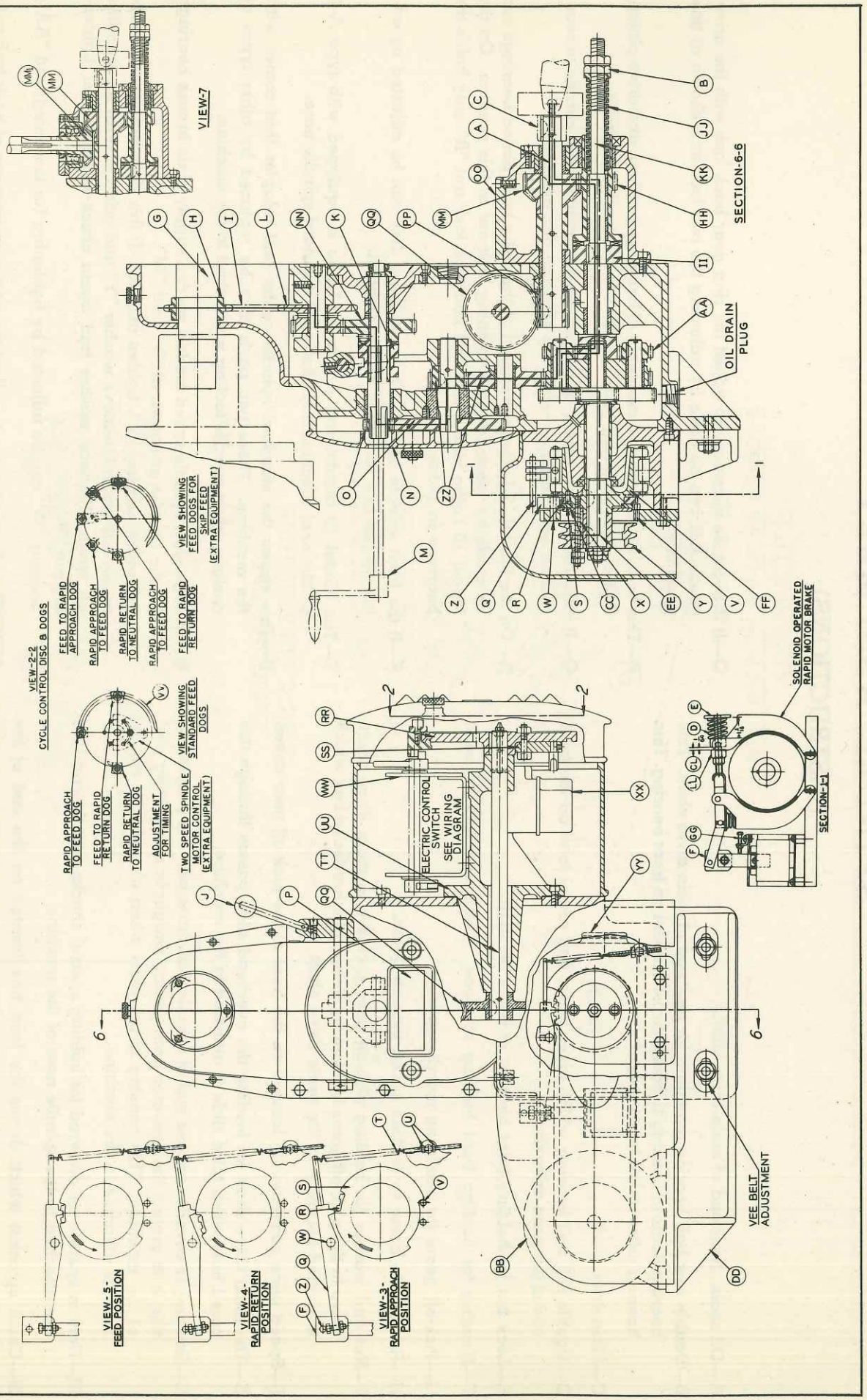
T—The Model 10 Sundstrand Automatic Lathe is equipped with type A-2 6" National Machine Tool Builders' standard spindle nose.

U—This shows the standard spindle center and adapter that comes with the machine. These two parts may be replaced by other types of designs when special tooling is attached to the machine.

V & W—On slow spindle speed models we can supply plain bronze bearings for the spindle as shown at "V" and "W".
To adjust bearing "V", tighten nut "X". If this does not provide adequate adjustment, remove washer "Y" and grind several thousandths off width. Replace washer and again check bearing after tightening nut "V".
Bearing "W" can be adjusted by tightening (or loosening) nut "AA".

Z—If it becomes necessary to adjust the ring gear because of back-lash with the drive pinion, this can be done by adjusting two lock nuts shown at this position.

FEED BOX UNIT


VIEW-7
SECTION-6-6
OIL DRAIN PLUG
VIEW SHOWING FEED DOGS FOR SKIP FEED (EXTRA EQUIPMENT)
FEED TO RAPID APPROACH DOG
RAPID APPROACH TO FEED DOG
RAPID RETURN TO NEUTRAL DOG
RAPID APPROACH TO FEED DOG
FEED TO RAPID RETURN DOG
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RAPID APPROACH TO FEED DOG
FEED TO RAPID RETURN DOG
RAPID RETURN TO NEUTRAL DOG
ADJUSTMENT FOR TIMING
TWO SPEED SPINDLE MOTOR CONTROL (EXTRA EQUIPMENT)
VIEW SHOWING STANDARD FEED DOGS
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SECTION-1-1
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VIEW-5- FEED POSITION
VIEW-4- RAPID RETURN POSITION
VIEW-3- RAPID APPROACH POSITION

FEED BOX UNIT (Instructions)

ADJUSTMENT OF SOLENOID OPERATED RAPID MOTOR BRAKE

(Section 1-1)

1—Compress torque spring "D" by turning Screw "E" until length of spring is 1-1/16". While making this adjustment, maintain a clearance of 1/64" at "CL" when the brake is applied. When the desired torque is obtained, be sure that the clearance at "CL" is 1/64", then lock nut "LL" in position.

2—Equalize the clearance between the brake shoes and pulley when the brake is released by adjusting screw "GG".

3—When brake lining wears, the clearance at "CL" decreases. Never permit this clearance to become zero, since a complete loss of torque will result. When clearance "CL" becomes low again adjust to 1/64" by turning screw "E". No change in torque will result from this adjustment if lock nut "LL" is not changed.

4—To check adjustment of brake, depress solenoid plunger "F" Rapid traverse pulley "FF" should turn freely.

MANUAL OPERATION OF FEED CYCLE (Section 6-6)

To check tool set up, disengage feed box from main spindle by moving feed shifter lever "J" to "Feed Out" position which disengages feed clutch "K". Tool slides may then be cranked thru their cycles by hand crank "M" which is inserted thru hole in pick-off gear cover "N". Before starting machine again, move shifter lever back to "Feed In" position.

POWER FEED TO CARRIAGES

The gear train for power feed to carriages is shown by heavy solid line on Section 6-6. Power is taken from main spindle "G" and transmitted by sprocket "H", roller chain "I", sprocket "J",clutch gear "NN", clutch

tact with lock ring by pressure of springs "X" also rotates until upper slot clears point of lock finger. Pressure of adjustable tension spring "T" causes lock finger to drop into engagement with slot in lock ring, thereby locking shaft and gear "EE". During balance of feed stroke, locking mechanism is in the position shown at view 5.

When the feed to rapid return dog (shown on view 2-2) engages the electrical control switch, the spindle motor is stopped and power is applied to the rapid traverse motor and the solenoid. Brake is released, and motor runs in direction opposite to its rotation during rapid approach stroke. At the end of the rapid return stroke the rapid return to neutral dog engages electric control switch which cuts off power to rapid traverse motor and solenoid. Locking mechanism is in the position shown at view 4 until cycle is repeated.

ADJUSTMENT OF SAFETY CLUTCH (Section 6-6)

Safety clutch "II" is keyed to planetary driven gear "KK" and held in engagement with safety clutch gear by spring "JJ". In case positive interference is met during machine cycle the clutch will slip, eliminating the danger of breaking any parts. Tension of spring is set at the factory for normal requirements; however, if a change in tension is required lock nuts "B" may be adjusted.

POWER TAKE OFF FOR OVERHEAD SLIDE (View 7)

The overhead tool slide is extra equipment and when furnished, power take-off is from gear "MM" on the feed drive shaft to gear "MM1" on the overhead drive shaft assembly. When overhead tool slide is not furnished, cover "OO" is used on gear housing.

CYCLE CONTROL DISC AND DOGS

The machine cycles are controlled by adjustable dogs, mounted on a circular dog disc "RR", and they engage a finger on electrical control

"K", pick-off gears "O", gears "ZZ", planetary gear assembly "AA", safety clutch gear "HH", main drive shaft gear "MM", and feed drive shaft "A" which is connected to feed drive unit, as shown on page 19. As power for feed drive is taken from spindle "G" the spindle speeds and carriage feeds are interlocked.

POWER RAPID TRAVERSE

Power rapid traverse gear train is shown by heavy broken line on Section 6-6. Power is supplied by the reversible rapid traverse motor "BB", thru vee belts to sheave "Y" on integral shaft and gear "EE" which meshes with planetary gear assembly "AA". From this point on, feed and rapid traverse gearing is the same. Proper tension of vee belts for rapid traverse motor is obtained by moving the adjustable motor bracket "DD".

To prevent rapid traverse shaft "EE" from creeping during feeding stroke a locking mechanism is provided. Lock ring "R" is pinned to brake pulley "FF". Friction disc "S" is loosely mounted adjacent to the lock ring and held in place by friction plate "CC" and springs "X". (Compression of these springs is set at the factory and does not require adjustment.) Lock finger "Q" pivots on stud "W" which is pressed into the brake bracket. A tension spring "T" (See View 3) with adjusting nuts "U" is mounted on the end of the lock finger. This mechanism operates as follows, assuming a standard machine cycle of rapid approach, feed, rapid return and stop.

Control lever is moved to rapid approach position. This starts the spindle motor and rapid traverse motor; at the same time plunger "F" (See Section 1-1) of the solenoid is pulled down, releasing brake. As the plunger moves downward, pin "Z" strikes the end of lock finger "Q", releasing lock ring "R". Friction disc "S" moves with lock ring until stopped by retaining pin "V". During entire rapid approach stroke, the locking mechanism is in position shown at view (3).

When the rapid approach to feed dog (shown on view 2-2) engages the electric control switch, thus starting the feed stroke, power is cut off from the rapid traverse motor and solenoid. Rapid traverse motor stops and solenoid plunger "F" rises, thereby applying braking pressure to pulley "FF".

Lock finger "Q" is still resting on friction disc "S" as shown in view (3). During the feeding stroke integral shaft and gear "EE" must remain stationary in order that planetary gear assembly "AA" may function. The counter-clockwise movement of the planetary gear assembly during the feeding stroke at times exerts a greater force on shaft and gear "EE" than the solenoid brake can hold. Thus shaft and gear "EE" with brake pulley and locking ring slowly rotate clockwise. Friction disc "S", held in con-

switch "WW". These dogs are shown mounted on the dog disc in view 2-2. A circular dog ring "VV" forms an integral part of the feed dog, and prevents the switch from accidentally tripping into rapid approach during the feeding cut. The dog disc is mounted on the end of worm wheel shaft "TT", and is driven by worm wheel "QQ" and worm "PP" from the main drive shaft. The electric control switch is mounted on switch bracket "UU", which also provides the mounting for the dog disc shaft.

TWO SPEED MOTOR CONTROL (Extra Equipment)

If two speeds are required, an additional switch "XX" is mounted under switch bracket "UU" and a trip dog "SS" is bolted to the dog disc. At any predetermined point in the feed stroke, the trip dog can be set to engage switch "XX" and the speed either increased or reduced depending on the wiring of the motor starter. The ratio in which the speed is changed depends on the type or number of windings of the motor. A series of closely spaced mounting holes for the trip dog are provided in the dog disc allowing close adjustment for timing.

LUBRICATION OF FEED BOX

"YY" indicates the oil level in the feed box. Oil level must not be allowed to go below the line shown on gauge.

FEED CHANGES

Feed changes are made by changing of pick-off gears "O" housed under gear cover "N." Plate "P" attached to this cover shows feeds available and gear combinations necessary to obtain these feeds.

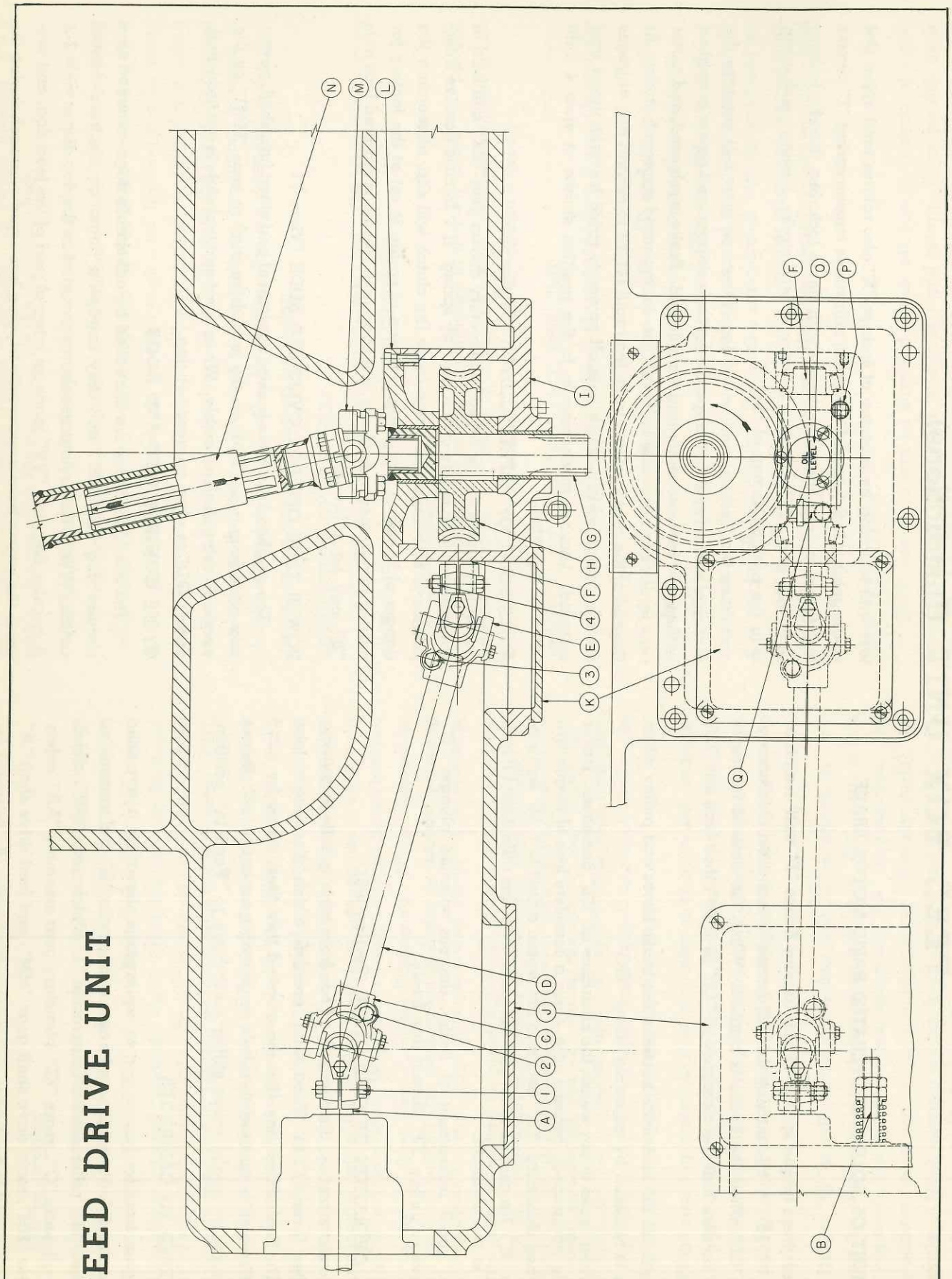
REMOVAL OF COMPLETE FEED BOX UNIT

The complete feed unit can be easily removed from the machine in the following manner:

First, remove the housing covering sprocket "H" and disconnect chain "I". Then remove cover "J" (page 19) and disconnect universal joint "C" from the feed shaft by loosening clamp screw 2. The complete feed unit can then be taken off by removing the six screws and two dowels which hold it to the headstock casting. If machine is equipped with an overhead attachment it will be necessary to remove complete overhead bracket from headstock and also overhead drive shaft (see view 7) before complete feed box unit can be removed.

SKIP FEED (Extra)

Skip feed dogs can be supplied which will furnish a cycle of rapid, approach, feed, rapid, feed, and then rapid return. Dogs for this cycle (furnished as extra equipment) are set in same manner as regular control dogs and are shown on view 2-2.


FEED DRIVE UNIT
N
M
L
I
H
G
F
4
E
3
K
A
1
2
C
J
D
F
O
P
OIL LEVEL
Q
B

FEED DRIVE UNIT

(INSTRUCTIONS)

A—Drive shaft from feed and rapid travel box. See Page 17 & 18.

B—Adjusting nuts for safety clutch which is located in feed and rapid travel box. Tension or adjustment can be readily made by removing cover "J". See Pages 17 & 18 for description of adjustment.

C—Forward universal joint. This joint is self-lubricating and requires no attention.

D—Shaft to connect universal joints.

E—Rear universal joint. This joint is self-lubricating and requires no attention.

F—Worm shaft to which rear universal joint is attached.

The complete removal of assembly C-D-E can be accomplished as follows:

(1)—Remove covers J and K.

(2)—Loosen screws 1-2-3-4.

(3)—Telescope shaft "A" and "D" into joint "C", then telescope joint "E" onto shaft "D". This will cause joint "E" to become free from shaft "F".

(4)—Complete removal can now be made by pulling joint "C" from shaft "A". The assembly can then be removed from machine through opening made by the removal of "J".

The complete removal of feed and rapid travel box can be made. See pages 17 & 18 for description. The complete removal of power unit "I" can also be made by removing screws from face of housing and pull assembly from bed of machine. The assembly parts at "M" and "N". When reassembling be sure that arrows on "M" and "N" are in line as shown.

G—Pinion that drives front carriage in feed and rapid travel.
Extension of this shaft drives rear slide.

H—Worm wheel attached to "G" and driven from worm shaft "F".

I—Housing of worm and worm wheel assembly.

J—Cover for inspection, adjustment, or disassembly.

K—Cover for inspection or disassembly.

L—Rear cover and bearing for worm and worm wheel assembly that entirely encloses this unit.

M—Universal joint attached to "G" for drive and adjustment of rear slide through slip joint construction. This joint is self-lubricating and requires no attention.

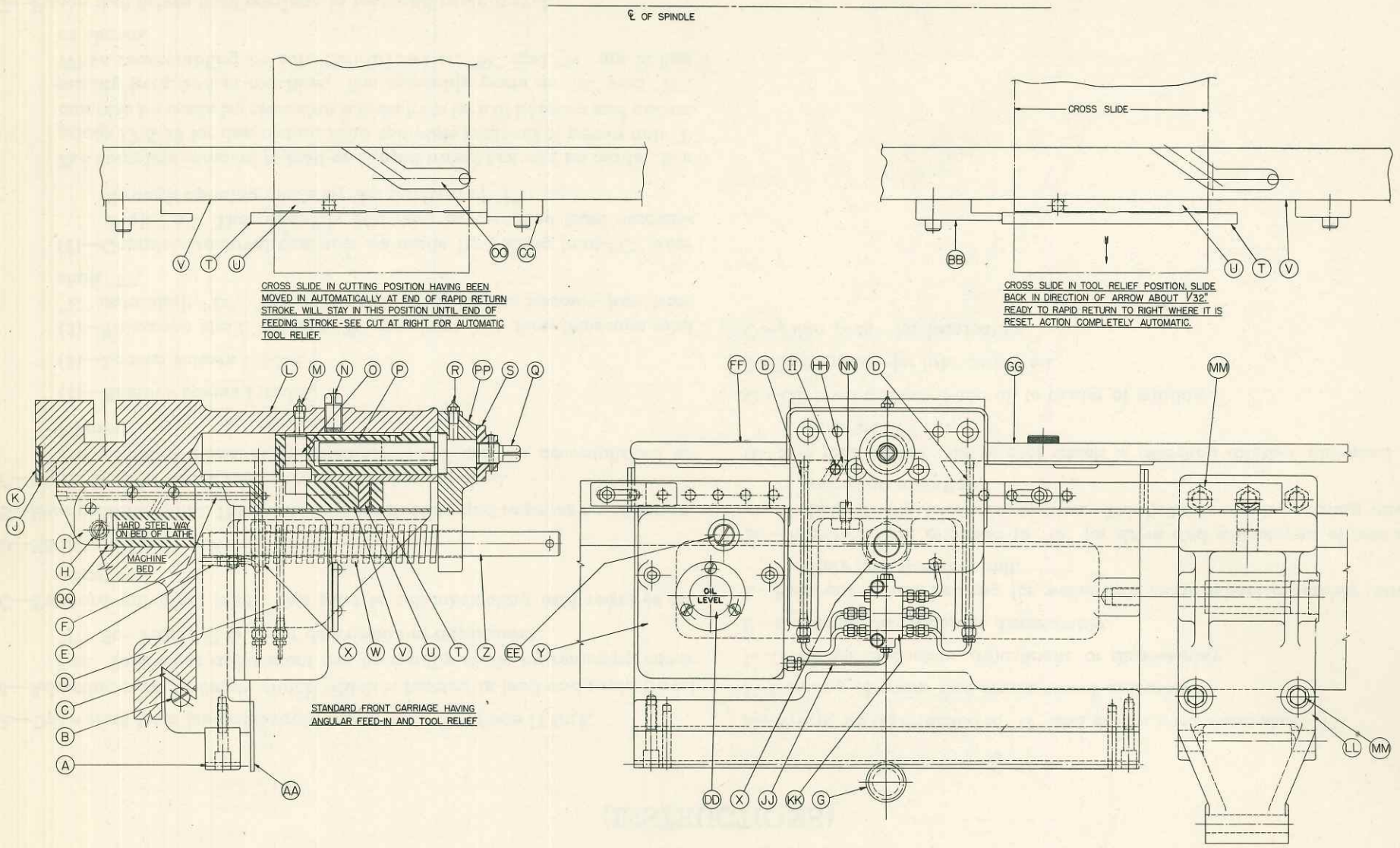
N—Slip joint at the rear end of which is attached another universal joint same as "M".

O—Oil level gauge—keep oil to center of window.

P—Drain plug—for lubricating oil.

Q—Filler plug—for lubrication.

FRONT CARRIAGE ASSEMBLY (with Angular Feed-In & Tool Relief)



CROSS SLIDE IN CUTTING POSITION HAVING BEEN MOVED IN AUTOMATICALLY AT END OF RAPID RETURN STROKE. WILL STAY IN THIS POSITION UNTIL END OF FEEDING STROKE - SEE CUT AT RIGHT FOR AUTOMATIC TOOL RELIEF.

CROSS SLIDE IN TOOL RELIEF POSITION. SLIDE BACK IN DIRECTION OF ARROW ABOUT V32" READY TO RAPID RETURN TO RIGHT WHERE IT IS RESET. ACTION COMPLETELY AUTOMATIC.

STANDARD FRONT CARRIAGE HAVING ANGULAR FEED-IN AND TOOL RELIEF

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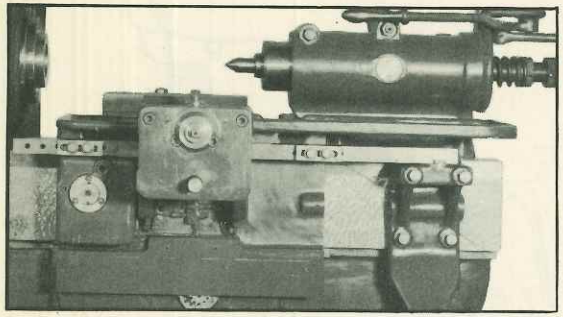
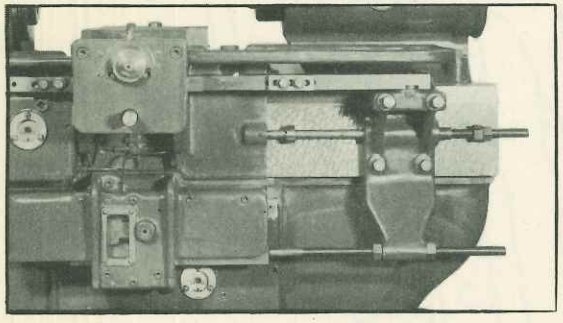
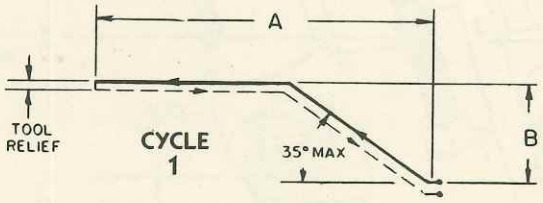
FRONT CARRIAGE ASSEMBLY
ANGULAR FEED-IN AND TOOL RELIEF
(INSTRUCTIONS)

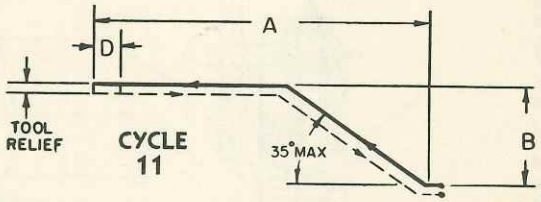


Angular Feed-In and Tool Relief



Slow-Up and Dwell





CYCLES

The standard front carriage for the Automatic Lathes, driven by pinion "G" (see page 21) and rack "A" attached to the main casting, has a cam bar controlled top slide to provide cycle No. 1. With a standard cam bar cycle dimensions are as follows:—Maximum A in Model 8 = 9¼", in Models 10 and 12 = 11". B = 1½" in Model 8, 2" in Model 10 and 12. Special cam bars can be provided for work requiring contour turning.

A standard Slow-Up and Dwell Attachment (see above photo) can be added to the carriage to provide cycle No. 11. Maximum dimensions for A and B same as given above. Instructions for setting and adjusting the Dwell Attachment given on page 24.

CAUTION:

to reduce pressure of spring "W". The cam bar now can be pulled thru the carriage towards the right sliding the cam bar bracket off the end of the front rail.

Stationary tool relief block "U" is held in place by pin "NN". Push block "U" towards center of machine to clear pin "NN" and the block can then be removed thru the opening in carriage left by removal of cam bar. Tool relief block "T" can now be removed thru the same opening.

With cam bar and tool relief blocks taken out, the full top slide assembly including cam stud and bracket can be pulled back off the cross ways in the carriage.

To reassemble, reverse the above procedure checking gib carefully for proper bearing of the cross slide.

ADJUSTMENT OF CARRIAGE GIBS

The carriage is mounted to a hardened steel rail which is bolted to the machine bed. Two taper gibs, "C" for vertical plane and "QQ" for horizontal plane, provide means of adjusting the carriage for proper bearing. The wide end of the gib is at the right side and the gib screws "B" and "H" at both the wide and narrow ends serve as adjusting means. To test the

Before any power movement of the carriage, disconnect the tool relief blocks and run carriage thru cycle by hand making sure there is no outside intereferences with the slide, and also that the cam stud "O" does not strike dead end of cam track in cam bar when moving carriage to the right.

ADJUSTMENT OF CROSS SLIDE

Cross Slide "L" is carried in ways in the main casting of the carriage. Taper gib "HH" has gib screws "II" (at both wide and narrow ends) to provide means of taking up slack in the slide.

Cam stud "O" is held in cam stud bracket "P" which in turn is attached to slide by means of end bracket "PP". Cam stud "O" rides in slot "OO" and when the carriage is in motion the riser in the slot in the cam bar "V" (cam bar held stationary by cam bar bracket "LL") moves the slide cross wise.

Shaft "Z" acts as a guide rod for spring "W". Compression in this spring keeps cam stud "O" securely against cam bar. Nut "X" maintains pressure of spring "W". Turn nut clockwise to reduce pressure and counterclockwise to increase the pressure of the spring.

Screw "Q" provides means of adjusting slide for varying diameters of work. Collar "S", attached to this screw, is graduated to facilitate setting of slide to close dimensions. Before adjustment is made, loosen clamp screw "N" and be certain to tighten the screw again after the adjustment is made.

To avoid possible damage to the cam stud check spring "W" carefully after adjustment of cross slide to make certain the spring will not be compressed solid when the cam bar feeds the cross slide to depth.

To adjust the gibs of the cross slide, remove the cam bar, and tool relief blocks, following procedure given below. Then move slide in and out by hand adjusting gibs until there is just a slight "drag" to movement of slide. Then bring screw at small end up against end of the gib. Move slide back and forth by hand several times to make certain screws are contacting both ends so that gibs remain in adjustment.

REMOVAL OF CAM BAR, TOOL RELIEF BLOCKS & CROSS SLIDE

Cam bar is held stationary by means of a cam bar bracket "LL". The cam bar bracket is adjustable along the front rail bearing and can be clamped in position by the lock screws "MM".

"GG" is a guard to keep chips from cam bar and also serves as a tray for finished or unfinished parts. "FF" acts as a guard for the left hand end of the cam bar.

Guard "GG" is held in place by two pins and a knurled knob, and should be removed before attempting to take out the cam bar.

To remove the cam bar, take off block "BB" and loosen screws "MM" in bracket "LL". Loosen screw "N" and turn screw "Q" counterclockwise

gibs remove upper pick-off gear for the rear slide (See page 8) and remove cam bar bracket and move feed clutch lever (page 7) to feed out position. Then crank carriage towards tailstock until carriage rack "A" runs off pinion. Then move carriage back and forth by hand adjusting gibs until, when moving the carriage there is a slight "drag". Then bring gib screw at small end, up against the end of the gib. Move carriage back and forth by hand several times to make certain screws are contacting both ends so that gibs remain in adjustment. Reverse above procedure for reassembling.

REMOVAL OF COMPLETE CARRIAGE UNIT

To remove complete carriage unit, follow procedure given above for removal of cam bar, and cam bar bracket. With these units removed crank carriage until rack "A" runs off the pinion after which the complete carriage can be slid off the end of the front rail.

To reassemble reverse the above procedure and check gibs carefully for proper alignment.

ADJUSTMENT OF TOOL RELIEF BLOCKS

Block "T" is the movable portion and block "U" the stationary portion of tool relief. The movable tool relief block is shifted into and out of "relief" position by knockout blocks "BB" and "CC" which are adjustable along the cam bar. Follow instructions on above drawing (page 21) for proper setting of blocks "BB" and "CC".

D—Pressure lubrication to bearing of cross slide.

E—Pressure lubrication to front of rail and to gib "C".

F—Pressure lubrication to "Hard Steel Ways" on top of bed.

I—Felt Wipers and guards attached to each end of carriage to protect bearing on "Hard Steel Ways".

J & K—Felt Wiper and guard attached to cross slide to protect bearing in carriage ways.

M—Lubricator (manual)

Y—Automatic pressure lubricator which distributes oil to all important bearings.

AA—Guard to protect rack and pinion from chips and coolant.

DD—Oil level gauge for automatic pressure lubricator. Be sure oil is always to center of window for proper lubrication.

EE—Filler plug for automatic pressure lubricator.

JJ—Lubricator lead pipe to manifold.

KK—Manifold for distributing proper amount of oil to each bearing.

STRAIGHT FEED-IN AND DWELL ATTACHMENTS
(FOR FRONT CARRIAGE)

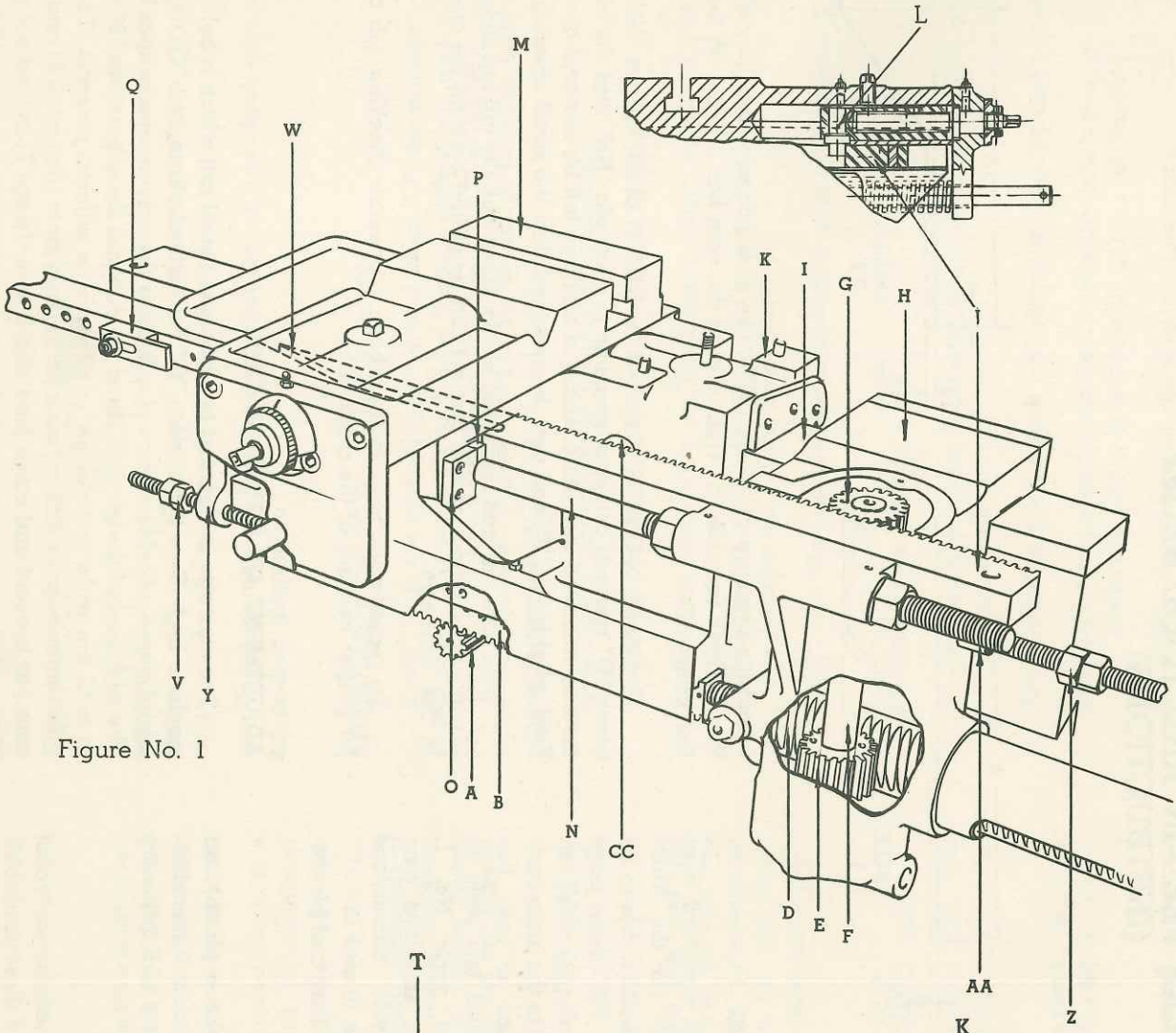


Figure No. 1

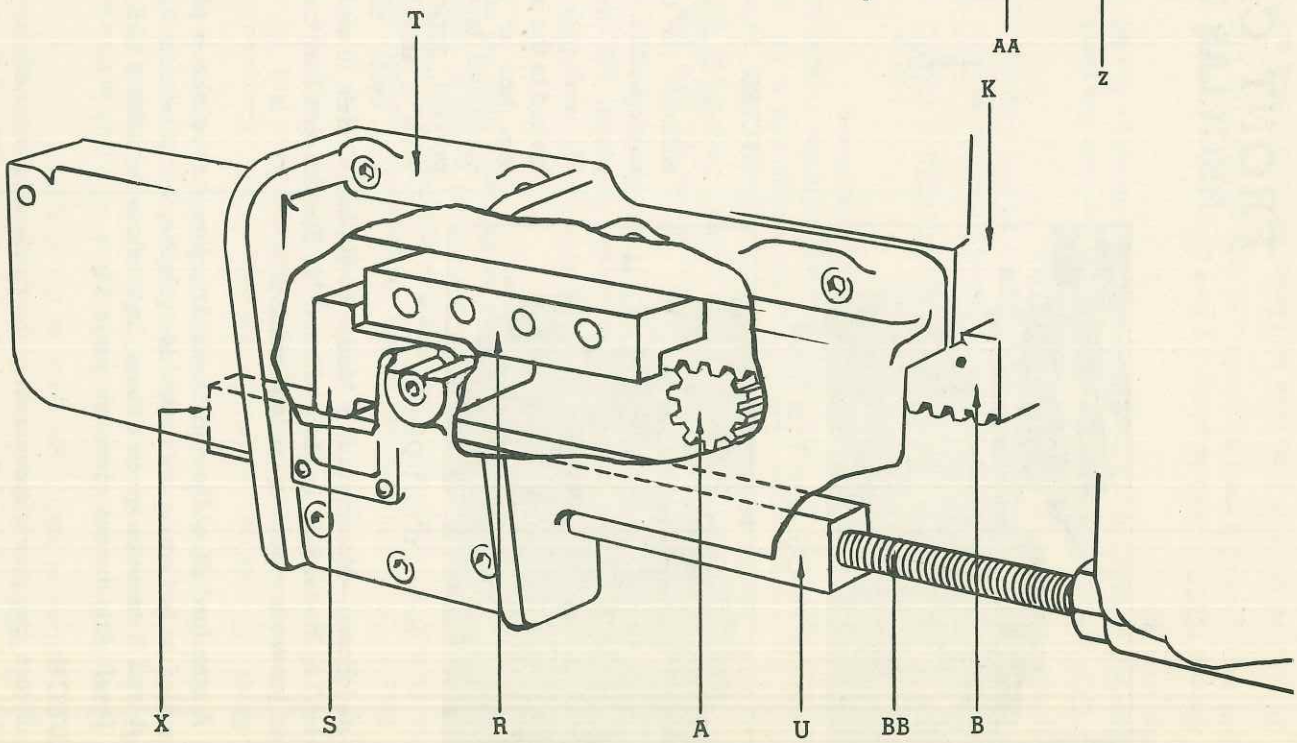
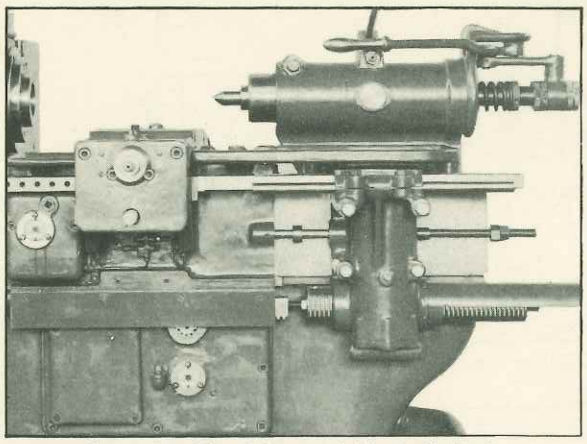
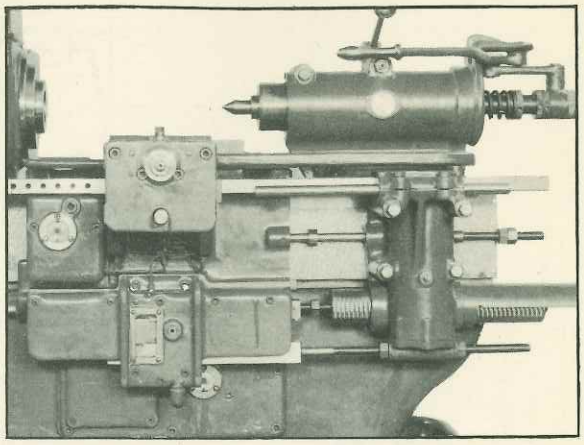


Figure No. 2

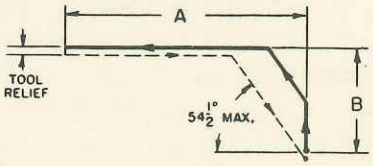


Straight Feed-In and Tool Relief

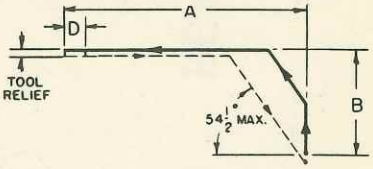


Straight Feed-In, Tool Relief and Dwell

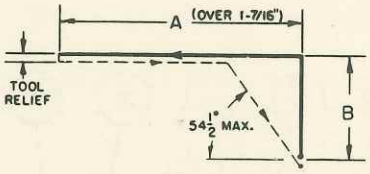
CYCLE 20



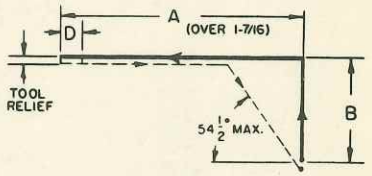
CYCLE 30



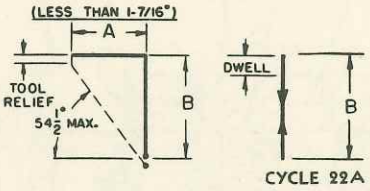
CYCLE 21



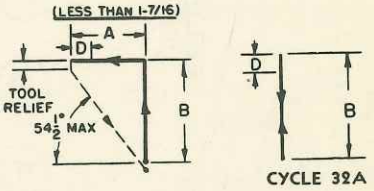
CYCLE 31



CYCLE 22



CYCLE 32



CYCLES

Cycle diagrams 20 thru 22A are standard cycles obtainable with the straight feed-in and tool relief attachments. By applying a Dwell Attachment a slow up and dwell for the end of the stroke is provided as shown in cycle diagrams No. 30 thru 32A.

With a standard cam bar, cycle dimensions are as follows: Maximum A in Model 8=7⅜", in Models 10 and 12=5¾". B=1½" in Model 8, 2" in Model 10 and 12. Special cam bars can be provided for work requiring contour turning.

STRAIGHT FEED-IN ATTACHMENT — FIGURE No. 1 PAGE 23 (EXTRA EQUIPMENT)

Diagram No. 1 shows position of various units at start of a cycle. Pinion "A" turns counter-clockwise driving rack "B" from right to left and in turn through rack "D", gear "E", shaft "F" and gear "G", move cam bar "J" from left to right. (Note rack cut on cam bar.) The carriage is stationary for straight feed-in until the end of rack "B" contacts carriage bracket "Y" after which the carriage will move longitudinally.

Top slide "M" is mounted in cross ways in the carriage and is controlled for cross movement by cam pin "L" which rides in slot "W". As the cam bar moves from left to right, the riser in slot "W" actuates the slide for cross movement. Cross movement of the slide continues until the cam pin reaches the top of the riser.

For the return stroke pinion "A" turns clockwise reversing the direction of the racks. Nut "V" attached to rack "B" contacts bracket "Y" and pulls the carriage back to the starting position.

Friction shoe "CC" should be adjusted so as to hold carriage in desired position when cam bar starts to move.

D DWELL ATTACHMENTS

ADJUSTMENT FOR CYCLE NO. 21

Caution:—Read carefully Setting Up of Machine, page 8, and follow same procedure for disconnecting rear slide, tool relief, and setting of control dogs on control disc, and adjustment of tool slide.

Inch or crank by hand front carriage "K" into position at which straight feed-in is desired. Remove gear "G" and adjust cam bar "J" so that cam stud "L" is at base of riser in slot "W". Slide cam bar bracket "H" out to end of rack on cam bar and clamp to way "I" on machine. Bring adjusting screw "N" up against block "O". This acts as positive stop so that friction, due to drawing cam bar from left to right at start of cycle, will not move carriage from desired position. Screw "N" also resets the tool relief block "P" on the return stroke of the carriage.

Loosen nut "V" and set rack "B" so that there is same distance between end of rack "B" and carriage bracket "Y" as required for longitudinal travel of cam bar "J" to bring cam pin "L" from bottom to top of riser in slot "W". Bring nut "V" up against carriage return bracket "Y" at this point. Replace gear "G" on shaft "F" and slide and carriage will be timed so that longitudinal movement will start at end of cross stroke of slide.

Continue to "inch" or crank the machine by hand until the carriage reaches the end of the feed stroke desired. Then, adjust the relief knock-out block "Q" so that tool relief is in "out position." Adjust nut "Z" so that spring "AA" within housing is compressed about $\frac{1}{8}$". This keeps carriage from moving due to reversal of direction of racks when the return stroke starts. The carriage is now in position ready for rapid return.

ADJUSTMENT FOR CYCLE NO. 20

Cycle No. 20 is set up in the same manner as cycle No. 21 excepting that the distance between the end of rack "B" and bracket "Y" (at start of cycle) corresponds to the amount of longitudinal travel of cam bar "J" required to bring cam pin "L" from bottom of riser to start of angular feed.

ADJUSTMENT FOR CYCLE NO. 22

Cycle No. 22 is same as cycle No. 21 excepting that tools return on angle without any longitudinal movement. Set up of cycle is made in exactly same manner as No. 21.

ADJUSTMENT FOR CYCLE NO. 22A

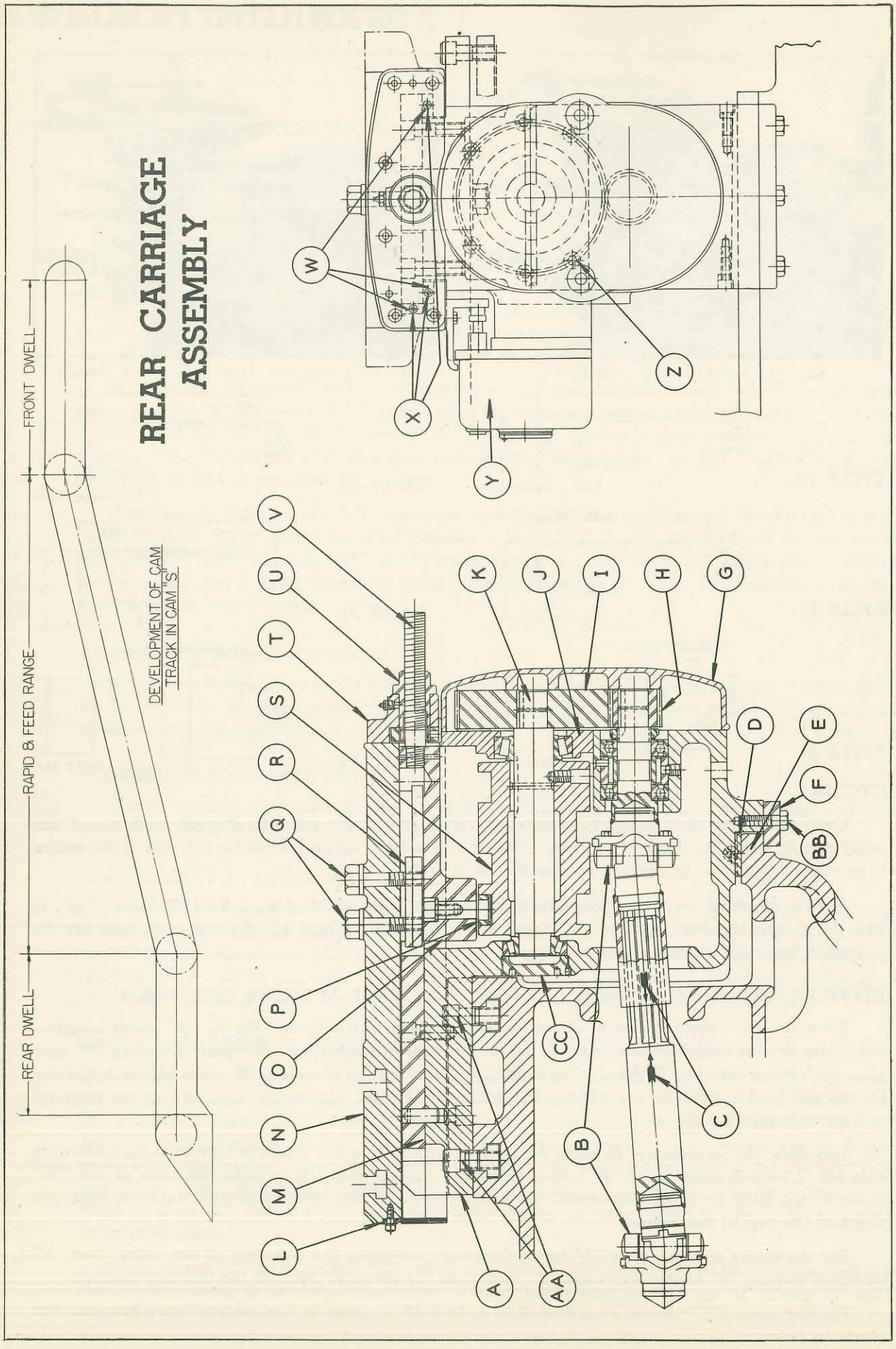
General Procedure for setting up cycle No. 22A is same as cycle No. 21. However, set rack "B" so that there is a greater distance between end of rack and bracket "Y" than is required for longitudinal movements of cam bar "J" during cross movement of slide "M". Then, when cam pin "L" reaches top of riser in cam slot "W", it will ride on straight edge of cam bar causing slide to dwell until rapid return. $\frac{1}{4}$" to $\frac{1}{2}$" travel on straight edge of cam bar should be sufficient.

DWELL ATTACHMENT — FIGURE NO. 2 PAGE 23 (EXTRA EQUIPMENT)

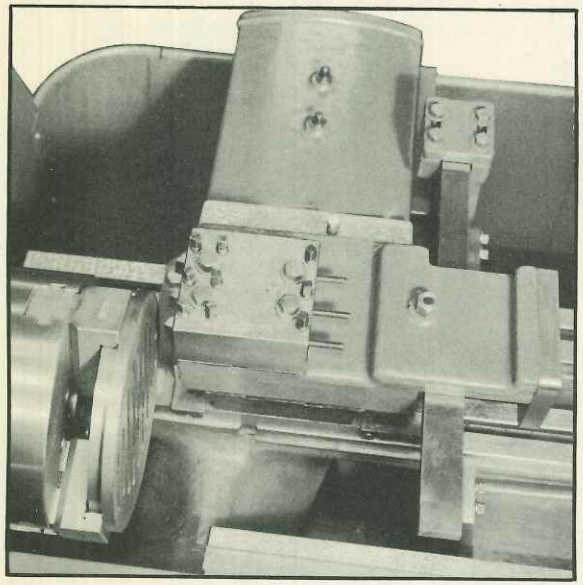
The Dwell Attachment can be furnished for either the Straight Feed-in or Angular Feed-in type of carriage. It is composed of housing "T" bolted to the carriage, block "R" bolted to rack "B", shoe "S" attached to housing "T", cam "U" carried in the housing, and adjusting screw "BB" which holds the cam to the cam bar bracket. Shoe "S" remains in the upper position (as shown in Figure 2), when supported on the upper edge of cam "U". Rack "B" moves from right to left (in feed or rapid approach) under actuation of pinion "A", but the carriage will remain stationary until block "R" picks up shoe "S". Dwell at this point is determined by distance between block "R" and shoe "S" at start of cycle.

Adjust cam "U" so that shoe "S" will drop over riser "X" at point at which dwell, at end of longitudinal feed stroke is desired. When shoe "S" is in lower position on cam "U" block "R" will pass over the top of the shoe and the carriage will dwell. In the last 3/16" of longitudinal feed there is a slow up in the feed rate and finally dwell as shoe "S" drops over the riser "X".

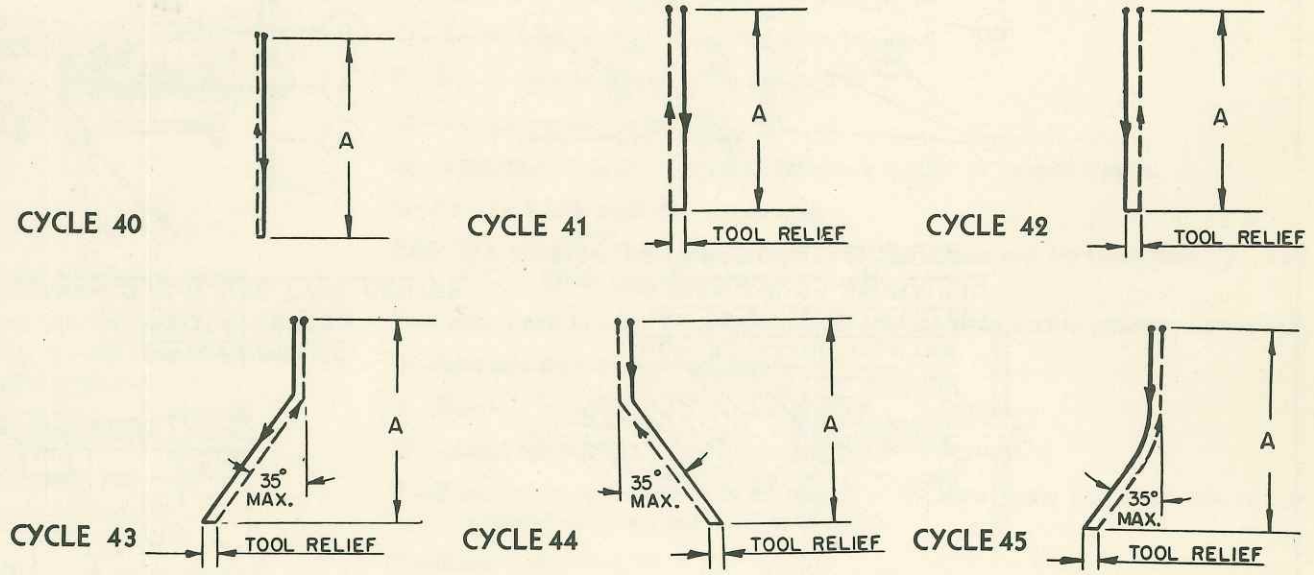
REAR CARRIAGE ASSEMBLY



REAR CARRIAGE ASSEMBLY
(INSTRUCTIONS)



Rear Slide Assembly with
Angular Feed-In and Tool Relief



CYCLES

The standard rear slide assembly provides a straight cross feed movement to the rear slide as shown in cycle No. 40. Tool relief and angular feed-in as shown in cycle diagrams 41 thru 45 can be had but they require cross slide, tool relief blocks, and cam bar (see above photo) which are furnished as extra equipment. Adjustment of tool relief blocks is the same as tool relief attachment for the front carriage (see page 21).

Plate "J" which takes the thrust of the cut can now be removed by taking out the six screws "Z" after which the full cam assembly can be removed from the housing.

To reassemble, the above procedure is reversed, after which any adjustment of the cam bearings can be made by adjusting nut "CC". (Follow procedure Adjustment Of Feed Cam.)

LONGITUDINAL ADJUSTMENT OF CARRIAGE

To adjust the carriage longitudinally, loosen screws "AA" and "BB". After sliding the carriage into the desired position, tighten screws "AA" and adjust gib "D", if necessary, before tightening screws "BB".

REMOVAL OF TOP SLIDE

Top slide "N" slides on bearing "M". Screws "Q" thru the T-Bar "R" clamp the cam roller bracket "O" to the slide. To remove the slide first take out the six screws "DD" which hold the back plate "T" to the slide. Then unscrew adjusting nut "U" until the nut and back plate are completely free of the screw "V". Gibs "W" can now be taken out and the top slide drawn back off the bearing "M". With the slide off, the complete cam roller bracket assembly can be lifted out and the cam can be inspected thru the opening in bearing plate "M".

To assemble reverse the above procedure.

REMOVAL OF COMPLETE REAR CARRIAGE UNIT

The main casting "A" of rear carriage when assembled with parts has an upper and lower mounting. At the upper mounting, it is anchored to the bed by clamp screws which register in T-bars held in T-slot in machine bed. At the lower mounting "E", it is held in position by clamp strap "F". To remove the complete unit remove screws "BB", clamp strap "F" and clamp screws "AA". The drive to the rear slide is thru a telescoping spline shaft and tube which separates—the shaft being attached to the front drive unit and the tube to the universal joint attached to the rear carriage unit. When the complete assembly is lifted from the machine, the drive shaft parts in accordance with the above. The complete assembly must be lifted straight up for approximately $\frac{1}{2}$" to clear the key in the T-slot at the upper mounting.

When reassembling make certain that the arrows on the spline shaft and tube are in line. Then clamp the carriage in place by reassembling screws at "AA" and "BB". Adjustment of carriage for height between upper and lower mountings can be made thru taper gib "D". This adjustment must be made before tightening screws at "AA" and "BB".

REMOVAL OF FEED CAM ASSEMBLY

To remove the complete cam assembly the top slide and cam roller must first be removed. (Follow procedure Removal Of Top Slide.) Next remove pick-off gear cover "G" and upper pick-off gear "I". Back-up

ADJUSTMENT OF GIBS

For adjustment the rear slide is provided with three taper gibs"W". The wide end of the gib is at the rear and gib screws "X" at both narrow and wide ends serve as adjusting means.

To test adjustment of the gibs, remove pick-off gear "I" and with special hand crank (furnished with machine) on shaft "K" crank the slide in and out. If the gibs are too tight the slide will bind and be hard to move. Gib screws "X" at the wide end should be unscrewed until the slide can be cranked in and out with just a slight "drag". Then bring up the gib screw "X" at the small end until the screw contacts the end of the gib. Run the slide back and forth several times to make certain the screws are contacting both ends so that the gibs remain in adjustment.

ADJUSTMENT OF FEED CAM

The rear slide is fed by cam "S" keyed on cam shaft "K" which, in turn, is mounted in taper roller bearings. Thrust nut "C" is turned clockwise to take up end play in the bearings and counter-clockwise to loosen the bearings. To make this adjustment the complete rear carriage unit must be removed from the machine. (Follow procedure Removal Complete Rear Carriage Unit.)

SETTING OF CAM FOR REQUIRED FEED STROKE

Remove pick-off gear "I" and turn machine thru cycle by hand or "inching" until FRONT carriage is at the end of its feed stroke. Leaving front carriage in this position, place the special crank (furnished with machine) on shaft "K" and turn cam to position at end of feed stroke. If dwell is desired, turn cam until roller enters "Front Dwell" position on cam. This sets the rear slide in relation to the front carriage so replace pick-off gear "I" and the front and rear slides will be in time.

The top slide can be set for different diameters of work by adjusting nut "U". Loosen screws "Q" before making this adjustment.

B—Universal Joints in drive shaft to rear slide.

C—Arrows for lining up drive shaft.

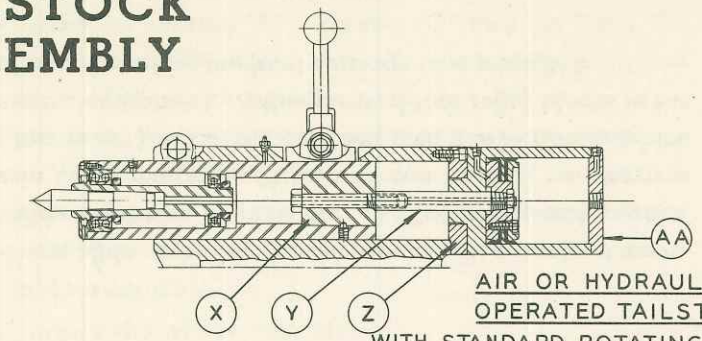
G—Pick-off gear cover.

L—Guard to keep chips from top slide bearing "N".

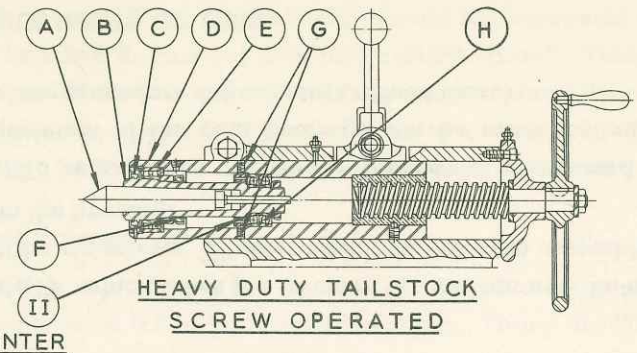
P—Cam roller.

Y—Automatic Lubricator Unit which lubricates all bearings in rear slide assembly.

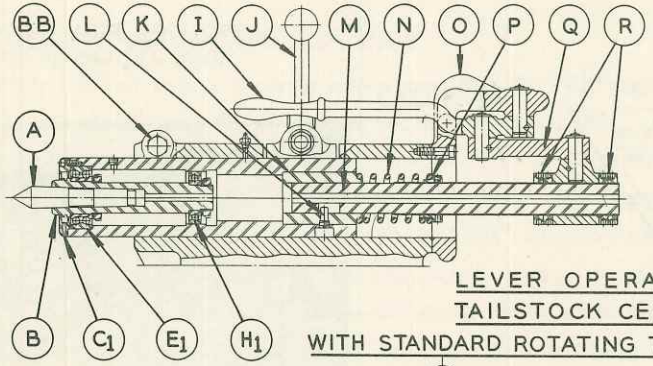
TAILSTOCK ASSEMBLY



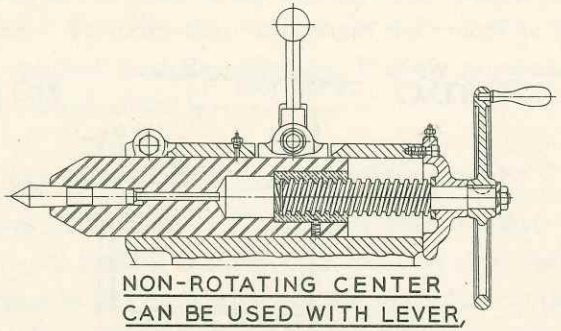
AIR OR HYDRAULIC
OPERATED TAILSTOCK
WITH STANDARD ROTATING TYPE CENTER



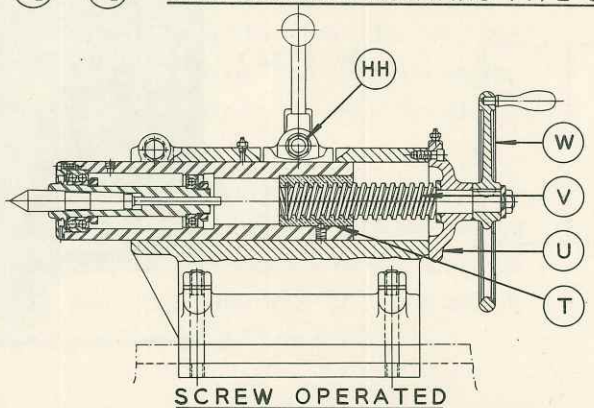
HEAVY DUTY TAILSTOCK
SCREW OPERATED



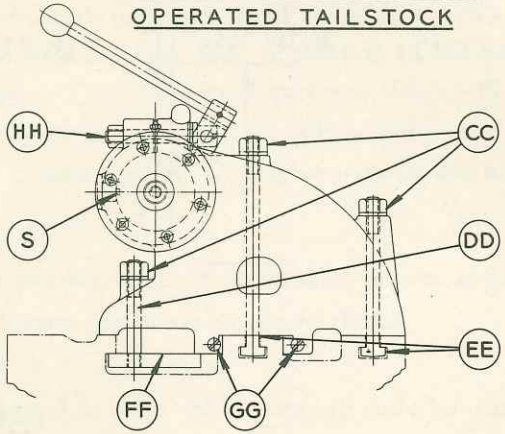
LEVER OPERATED
TAILSTOCK CENTER
WITH STANDARD ROTATING TYPE CENTER



NON-ROTATING CENTER
CAN BE USED WITH LEVER,
SCREW, AIR, OR HYDRAULIC
OPERATED TAILSTOCK



SCREW OPERATED
TAILSTOCK CENTER
WITH STANDARD ROTATING TYPE CENTER



TAILSTOCK ASSEMBLY

(INSTRUCTIONS)

The tailstocks are furnished in following combinations:

Standard rotating type center with lever, screw, air or hydraulically operated quill.

Heavy duty rotating type center with screw operated quill.

Non-rotating type center with lever, screw, air or hydraulically operated quill.

A—Tailstock center.

B—Rotating sleeve for live center.

C—Oil retainer.

D—Tailstock quill hardened and ground.

E—Front bearing taking radial load only. (For Heavy Duty Type)

E1—Front bearing taking radial and thrust load (St'd. rotating type)

F—Adjustment for bearing "E". The adjustment of this bearing is very important to good operation. This adjustment is very sensitive but it can be adjusted easily for proper rotation and rigidity.

G—Cone point screws to hold bearing retainer "II" in position.

H—Rear bearings taking thrust and radial load.

H1—Rear bearing taking radial load.

SPECIAL NOTE—To remove rotary sleeve assembly from tailstock quill

1. On the standard rotating type take out the screws holding the bearing retainer "C1" in place and the complete assembly can be withdrawn from the quill.
2. On the heavy duty type take out screws "G" which hold the bearing retainer "II" and then unscrew bearing retainer "C". The complete assembly can then be withdrawn from quill "D".

I—Lever for operating the tailstock quill.

J—Lever for operating cam which locks quill in housing.

K—Bushing pinned to quill "D" which serves as an end stop for spring "N". This bushing also serves as a bearing for "M" which has about 3/4" of movement so that tailstock center enters work under spring pressure.

L—Pin which holds "K" and "D" together and also acts as a limit stop to lost motion between "K" and "M".

M—Connection between quill assembly and toggle action made possible with lever "I".

N—Spring to produce pressure on tail center

O—Lever and toggle main support bracket.

P—Nut to adjust pressure on spring "N".

Q—Toggle arms.

R—Adjustment nuts to position tailstock center to proper depth.

S—Key to keep quill from rotating.

SPECIAL NOTE—The tailstock quill can be taken out by removing "S" and "O". Quill can then be removed.

T—Bronze nut located in tailstock quill for use with screw operated tailstock.

U—End bracket to support screw "V".

V—Screw.

W—Hand wheel.

X—Bushing in tailstock quill in which is located draw rod from air or hydraulic cylinder for motion to quill.

Y—Draw rod.

Z—End bracket to support air or hydraulic cylinders.

AA—Air or hydraulic cylinder.

BB—Permanent clamp. Requiring adjustment at very limited intervals.

CC—Nuts that hold tailstock housing to bed of machine.

DD—Studs.

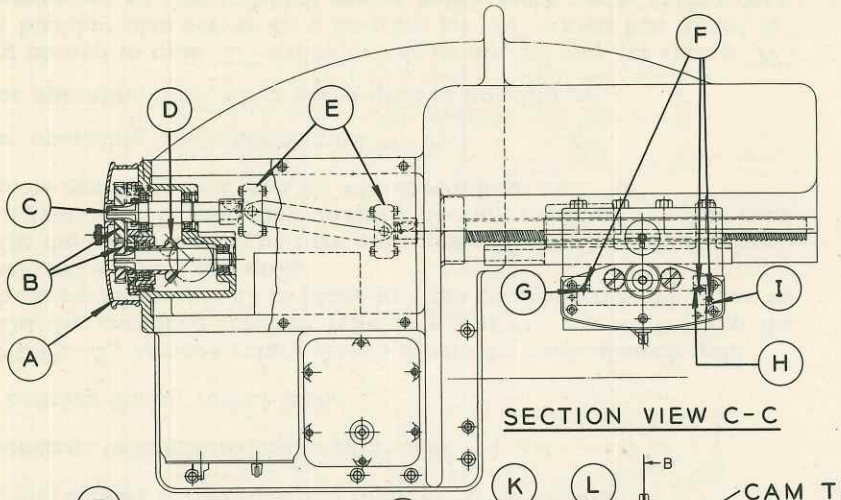
EE—Tee bolts.

FF—Clamp to hold front of housing securely to bed of machine.

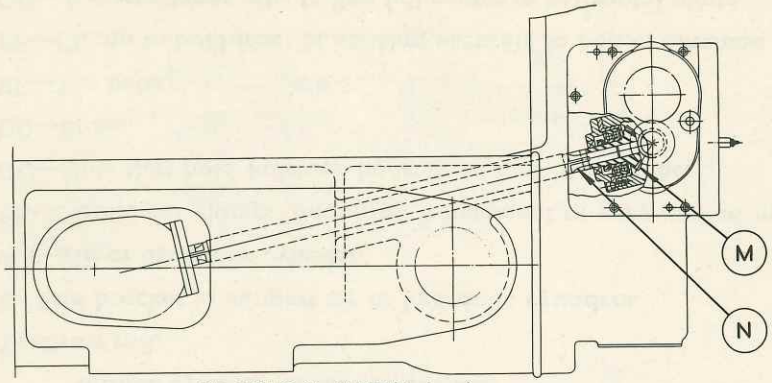
GG—Reverse taper gibs to line tail center in horizontal plane.

HH—Adjusting nut for quill clamp. Adjust so cam locks.

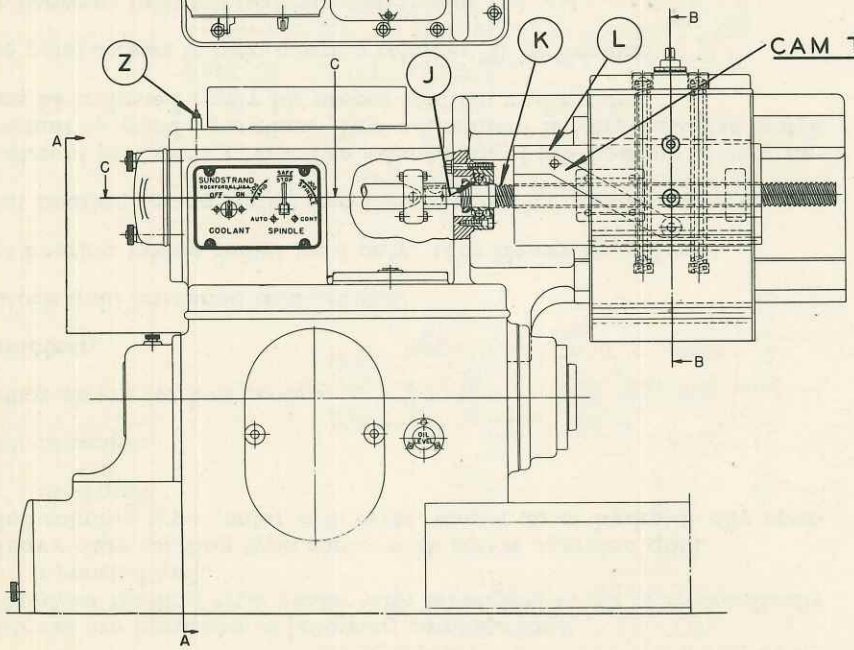
AUXILIARY OVERHEAD SLIDE (Extra Equipment)

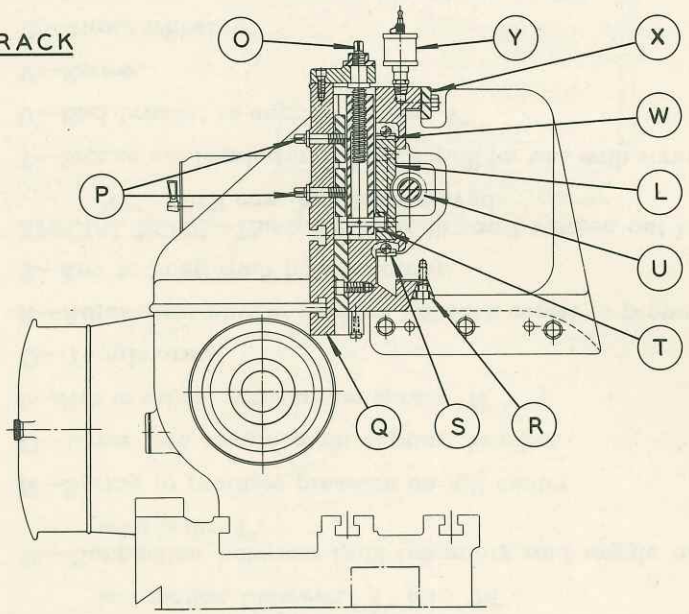


SECTION VIEW C-C



SECTION VIEW A-A





SECTION VIEW B-B

AUXILIARY OVERHEAD SLIDE (Extra Equipment)

CYCLES

The standard overhead tool slide provides a straight cross feed movement as shown in cycle No. 40 (page 26). Tool relief, angular feed-in, and longitudinal feed can be furnished, but they require special features not furnished with the standard slide.

FEED CHANGES

Feed changes can be made by changing pick-off gears "B" housed under cover "A". A feed plate showing possible feed changes and gear combinations necessary to secure these feeds is attached to the end of the overhead bracket.

POWER FEED TO OVERHEAD SLIDE

Power is taken from the feed unit (see view 7 page 17) and transmitted thru shaft "N", bevel gears "D" and "M", pick-off gears "B", universal joints "E", screw "K", to nut "U" which is attached to cam "L". Rotation of screw "K" imparts a longitudinal movement to cam "L". Cam roller "T" which is attached to tool slide "Q" rides in the slot in cam "L". As the cam moves longitudinally the riser in the cam track imparts a vertical movement to the tool slide. When the cam roller is in the horizontal portion of the cam track the tool slide will dwell.

ADJUSTMENT OF SLIDE GIBS

For adjustment the overhead slide is provided with three taper gibs "G", "H", and "I". The wide end of the gib is at the top of the slide and gib screws "F" serve as adjusting means.

To test adjustment of the gibs, remove pick-off gear "B" and with special hand crank (furnished with machine) on shaft "C" crank the slide up and down. If the gibs are too tight the slide will bind and be hard to move. Gib screws "F" (at the wide end) should be unscrewed until the slide can be cranked in and out with just a slight "drag". Then bring up gib screws "F" (at the small end) until screw contacts the end of the gib. Crank the slide in and out several times to make certain the screws are contacting both ends so that gibs will remain in adjustment.

LONGITUDINAL ADJUSTMENT OF OVERHEAD CARRIAGE

To adjust the slide longitudinally, loosen clamping gibs "R" and "X" and move slide into desired position. Tighten clamping gibs and reposition cam "L" for desired feed stroke (follow procedure Adjustment of Feed Stroke).

To insure accurate bearing between overhead carriage and overhead bracket a taper gib "S" is provided. This gib is adjusted very carefully before machine is shipped from factory and should require no further checking unless slide is repositioned. The large end of the gib is at the right and adjusting screws are provided at both large and small ends.

ADJUSTMENT OF FEED STROKE

Remove one of pick-off gears "B" and with crank (furnished with machine) on shaft "C" turn screw "K" until the cam is at the bottom of the stroke. If dwell is desired continue to turn until cam roller enters front dwell position on cam. Front and rear slides should be set in relation to work before replacing the pick-off gear.

The top slide "Q" can be set for different diameters of work by adjusting screw "O". Make certain the springs which hold the slide against the cam bar are under compression. Loosen screws "P" before making this adjustment.

CAM GIB

A taper gib "W" is provided to remove any slack between cam "L" and solid edge of overhead carriage. The wide end of this gib is at the left and gib screws at both wide and small ends provide means of adjustment.

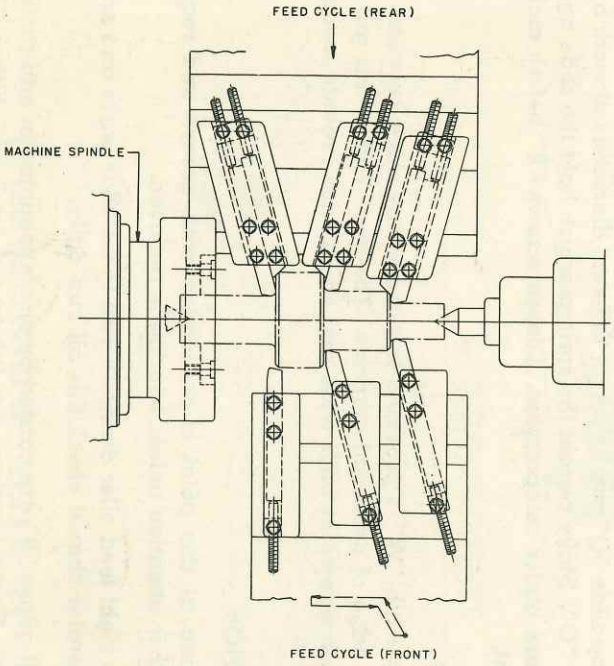
LUBRICATION

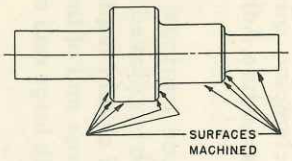
"J"—Bearing at this point is pre-loaded with grease and requires no further attention unless bearing is removed.

"Y"—This sight feed oiler distributes oil to the slide ways and screw "K". Operator should check this oil cup daily.

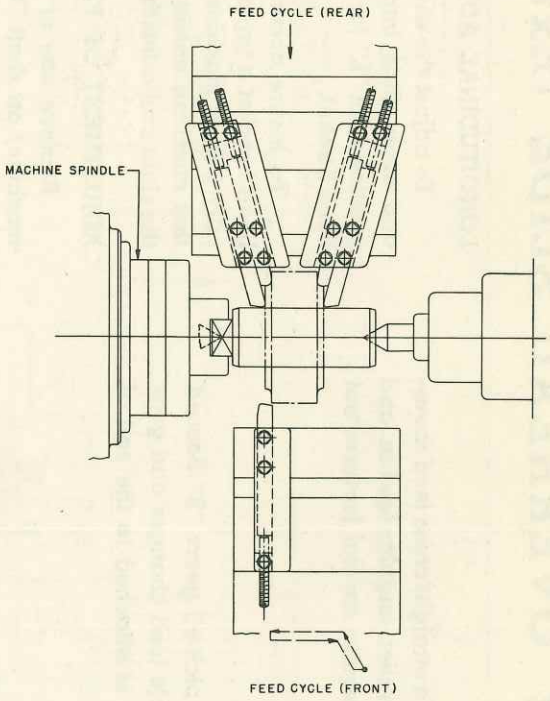
Z—Pick-off gears "B" are carried on shafts mounted in anti-friction bearings. These bearings are lubricated by "zerk" fitting "Z" which should be checked at least once each week.

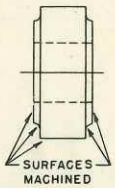
STANDARD TOOLING (Extra Equipment)





PART — Pinion Shaft
TOOLING—Equalizing Driver,
3 Double Tool Angular Blocks,
2 Single Tool Angular Blocks,
1 Single Tool Straight Block,
1 Rear Dovetail Sub-Base,
1 Front Dovetail Sub-Base.





PART — Gear Blank
TOOLING—Equalizing Mandrel
Driver, Work Mandrel,
2 Double Tool Angular Blocks,
1 Single Tool Straight Block,
1 Rear Dovetail Sub-Base,
1 Front Dovetail Sub-Base.

To increase the value of Sundstrand Automatic Lathes we have developed Universal Type Tooling suitable for handling a wide range of work. The above drawings show standard tool blocks arranged for the machining of a gear blank and pinion shaft. These tool blocks, mounted on dovetail slides for longitudinal adjustment, are interchangeable on the front and rear slides. They can be reversed, (end for end) thus providing a different center distance from end of block to center line of spindle.

In combination with machine features such as micrometer cross adjustment of the tool slides and the easily adjusted cycle control, these tool blocks can be used for a wide variety of parts of varying sizes.

To supplement the tool blocks, we have standard drivers of the pin, equalizing, and two-jaw types available at a very nominal cost. We would be pleased to furnish you with information regarding this standard tooling.

TYPICAL TOOLING APPLICATIONS

PART—Valve Plug

OPERATION—Taper Turn O.D. and Face Ends.

MACHINE—Standard Model 10 Automatic Lathe with regular longitudinal feeding front carriage and cross feeding rear tool slide.

PART—Aluminum Airplane Piston.

OPERATION—Turn O.D., Face Head, and Chamfer Ring Grooves.

MACHINE—Standard Model 10 Automatic Lathe with regular longitudinal feeding front carriage and cross feeding rear tool slide.

PART—Steering Knuckle.

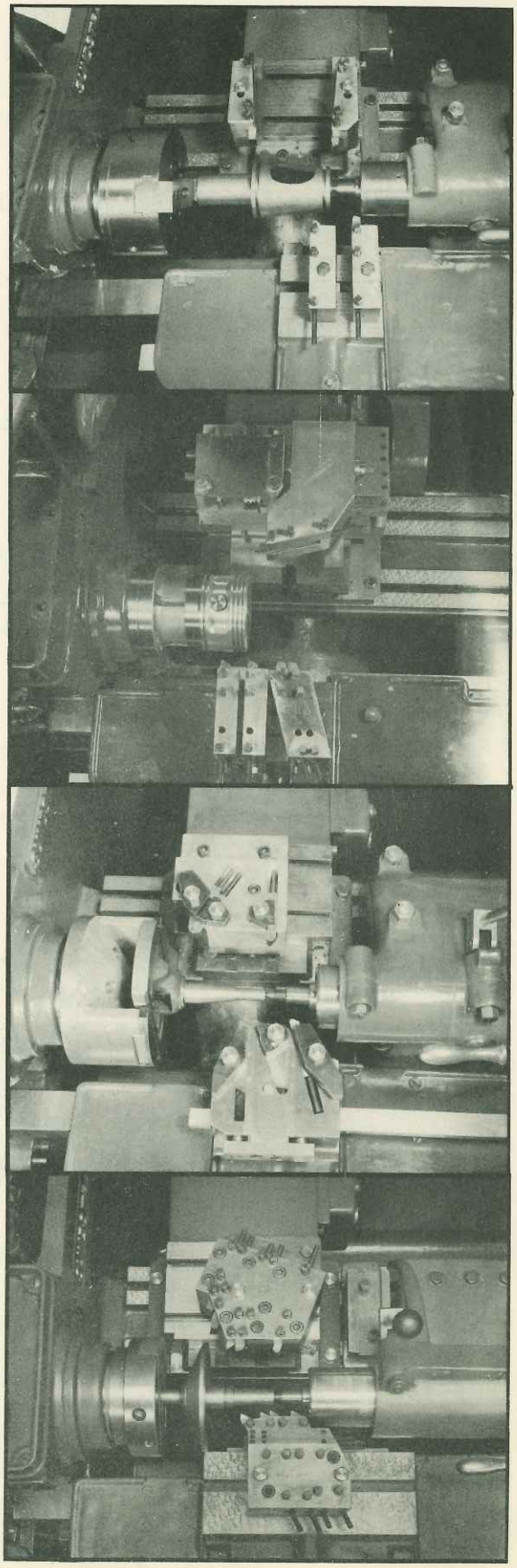
OPERATION—Straight turn three diameters, taper turn stem, face, and chamfer.

MACHINE—Standard Model 10 Automatic Lathe with regular longitudinal feeding front carriage and cross feeding rear tool slide.

PART—Valve Bumper.

OPERATION—Straight turn three diameters, face flange and two shoulders, chamfer flange and end of stem, and groove face of flange.

MACHINE—Standard Model 10 Automatic Lathe with wide front and rear tool slides.



In addition to the Automatic Lathes to which this Instruction Book applies, the Sundstrand Machine Tool Company manufactures the following products:

Milling Machines (Hydraulic, Mechanical, and Electric)
Centering Machines
Special Machines
Balancing Tools
Bench Centers
Index Bases

HYDRAULIC DIVISION
Hydraulic Pumps, Valves, and Controls
Fluid Motors
Hydraulic Transmissions

PNEUMATIC DIVISION
Pneumatic Sanding, Rubbing, and Polishing Machines

BROACHING DIVISION (American Broach and Machine Company Ann Arbor, Michigan)
Broaching Machines
Broaching Tools
Presses

We welcome the opportunity of furnishing information or quoting on any of the above equipment.

Div. 13

CABLE ADDRESS "SUNTOOL" LIEBERS LATEST CODE

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Washington, 25, D. C.

Attention: E. W. Chapin, Librarian

Gentlemen:

In acknowledgment of your request of September 15th, we are enclosing a copy of our "Instructions for Installation, Operation and Maintenance of a Model 10 Automatic Lathe." This book was first distributed in June of 1940. The Sundstrand Model 10 Lathe is covered by U. S. Patent letters #2,145,255, 2,144,735 and 2,206,886.

Previous to the distribution of the Model 10 instruction booklet, we prepared a similar booklet on our Model 8 Automatic Lathe. Distribution of the Model 8 Lathe booklet was started in January of 1940.

Yours very truly,

SUNDSTRAND MACHINE TOOL CO.

J. M. Kjellstrom
Sales Department

JMK:BL
encl.

RIGIDMIL

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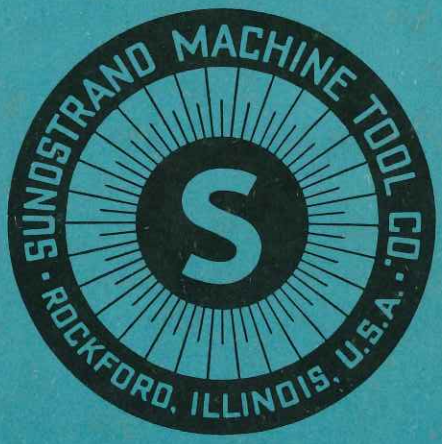
QUOTATIONS SUBJECT TO CHANGE WITHOUT NOTICE.
ALL OUR PROPOSALS, QUOTATIONS AND ACCEPTANCES OF ORDERS ARE MADE WITH THE MUTUAL UNDERSTANDING THAT ORDERS ARE NOT SUBJECT TO CANCELLATION.

STUB



Form. No. 10-2 Edit. 2

Litho in U. S. A.